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AUTHOR Kawasaki, Jodee Lynn
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ABSTRACT

Information-related competencies and training needed by professionals in the Montana Extension Service in order to acquire and disseminate information to clients electronically were studied in a needs assessment of administrators, specialists, and extension agents. An e-mail survey listing 37 competencies was completed by 96 extension agents and specialists. (Responses of administrators were not analyzed.) Responses were analyzed by a personal computer statistical package, and analyses were used to determine differences among demographic features and to rank order the competencies based on respondents' perceived level of importance and knowledge. Demographic factors and respondent characteristics showed no influence on the competencies because both strata of respondents needed to be taught information skills. Different training strategies need to be developed for agents and specialists because they ranked competencies differently and preferred different instructional methods. Lack of funds and equipment hampers use of electronic information technologies among extension employees. Twenty-five tables present survey findings, and six appendixes contain survey instruments and related materials. (Contains 54 references.) (SLD)

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INFORMATION-RELATED COMPETENCIES FOR MONTANA EXTENSION SERVICE PROFESSIONALS

by

Jodee Lynn Kawasaki

A thesis submitted in partial fulfillment
of the requirments for the degree

of

Master of Science

in

Agricultural Education

Montana State University
Bozeman, Montana

1994

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Information-Related Competencies for Montana Extension Service Professionals

Keywords: Needs Assessment, Montana Extension Service professionals, Electronic Information, Information Technologies

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ABSTRACT

The purpose of the study was to determine the information-related competencies and training needed by Montana Extension Service professionals to acquire and disseminate information to clients electronically.

A descriptive study was planned based on a design described by Borg and Gall (1989). The intention was to perform a needs assessment that describes the current situation and to determine differences that answer the objectives of the study. The population was stratified by Montana Extension professionals and consisted of administrators, specialists, and agents.

An email survey, prepared in part using the Total Design Method (Dillman, 1978), was used as the data collection instrument. Thirty seven competencies were identified and set up as a needs assessment model (Borich, 1980). A pilot study was used to validate and test the instrument. Assurance of the needed sample size was provided through two follow-up email messages to non-respondents. The double dip technique was employed to assure non-respondents were no different than respondents.

Responses to questions were analyzed by a personal computer statistical package. T-tests or analysis of variances were run on the data at the 0.05 level of significance. The analyses of the data were used to determine any differences among selected demographic features and to rank order the competencies based upon the respondents perceived level of importance and knowledge. The study's results were also used to determine learning and training preferences related to information technologies.

The data from this study reveal several factors which are impacting the use of information technologies by agents and specialists. Competencies with a positive weighted discrepancy score need to be taught. Selected demographic factors and other characteristics showed no influence on the competencies because both of the stratums need further education in information-related competencies. Different training sessions need to be developed for each stratum because of the reported difference in the ranked competencies, preferred instructional method, and training preferences. A lack of equipment, the cost of long distance telephone calls, or the secretary given the responsibility to do email limits the efforts of MES professionals in using electronic information technologies.

CHAPTER 1
THE PROBLEM

Introduction

The decade of the 1980's was the start of a global economy. With the European Community beginning the only integrated market and the fall of Communism, in Eastern Europe and the Soviet Union in the late 1980's and early 1990's, the global economy was off and running. Advances in telecommunications have contributed to this start of a global economy. Telecommunication links allow the demands placed on a local market by a global economy, such as increased diversity and competition, to be dealt with immediately. What ties a global economy to the U.S. Extension Service (ES) is the impact this economy has on the mission and role of Extension. The role of ES must change with the world. The ES must keep up or it will become a part of United States history like the Pony Express. There will not only be an impact on agriculture, but on many other industries and markets as well. These changes will trickle down to both consumers and workers. ES is for the consumer and the worker, and therefore must adopt an ever-changing role to meet these new demands.

New technologies were coming into existence long before ES got its start with the Smith-Lever Act of 1914. The telegraph, printing press, automobile, telephone, and new and improved motors and machinery influenced the Cooperative Extension Service from the start. The organization has adopted many new technologies and goals along the way. ES has brought research findings, new technologies and information

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for improving operations and lifestyles to its clients since 1914. Hybrid corn, tractors, fertilizers, pesticides and other chemicals, sewing machines, polyester cloth, and information on nutrition and new crops were a few of the technologies and types of information that ES has transferred to its clients. During these last decades, technologies and information which ES have transferred include such things as precision farming (using computers and satellites), biological weed control, ever-changing human nutrition and proper diets, and software programs for many different operations and businesses, to name a few.

Information literacy, defined as the ability to access and effectively evaluate information for a given need, is needed more than ever in order for global consumers to compete in the world today. Information literacy has been defined (Tessmer cited in Breivik, 1985) as:

> "1. An integrated set of skills (research strategy, evaluation) and knowledge of information tools and resources.
> 2. Attitudes of persistence, attention to detail, and caution in accepting printed word and single sources.
> 3. Time and labor intensive.
> 4. Need-driven (problem-solving activity).
> 5. Distinct but relevant to literacy and computer literacy.
> Information literacy is *not* only knowledge of resources, or library dependent as sole source, nor is only information finding but understanding and evaluating also" (p. 723).

There are databases and electronic networks throughout the United States that Extension professionals have access to via microcomputers. These networks and databases have helped Extension professionals to effectively organize and present information in the last decade. However, information literacy has yet to be achieved by many professionals (Harriman and Daugherty, 1992). The question needs to be asked

as to whether Extension professionals receive sufficient training in information access, retrieval, and dissemination? How are the databases and networks being used by Extension professionals, if at all?

Goode and Elliott (1992) conducted a study to identify the computer competencies Mississippi Extension professionals needed. These data show that Extension professionals were using computers on an average of six hours per week and that they had computer competencies. Smith and Kotrlik (1990) studied computer anxiety levels of Extension agents. The researchers found that Extension agents had computer anxiety, but not significantly higher than other professional groups. These two studies are related to this study in that computer technologies are involved in information gathering and transfer. This study will attempt to answer the question: "do Extension professionals have the necessary competencies to deal with the new information technologies?" There is no indication, after an extensive literature search, that other literature about information-related competencies needed by Extension professionals exists. Therefore, it is evident that there is a need for a comprehensive investigation of Extension professionals' competencies in the area of information literacy.

Statement of Purpose

The purpose of the study was to determine perceived level of importance and knowledge of selected information-related competencies and training needed by Montana Extension Service (MES) professionals for electronically acquiring and disseminating information.

Need for Study

According to Patton (1985), Extension has always been in the business of getting people to apply new knowledge and make use of information. However, the Future Application of Communication Technology report (ES-USDA and ECOP, 1992) states there is a need to increase staff knowledge and skills in communication and information technologies. Computers are here to stay; they will become an important tool to help the ES assimilate as well as disseminate knowledge. Shill (1992) noted that:

> "The agriculture information dissemination infrastructure is in a state of significant transition. Traditional institutions, such as the state agricultural extension services, have been forced to adapt to the emergence of electronic dissemination channels while still making active use of print and face-to-face communication mechanisms" (p. 313).

The basic model of the United States Extension Service has County Extension agents going to Extension specialists for information and publications. Specialists have some expertise to interpret, as well as the close proximity to find, information which agents do not have readily available. Due to the large amount of information produced during this Information Age, specialists should be well equipped to acquire and disseminate information electronically.

The Journal of Extension has an irregular column called "futures," devoted to the future of Extension, in which writers project what Extension needs to do to be successful in the 21st Century. "With less than two percent of the nation's population engaged in production agriculture, Extension must be seen as an organization staffed to meet the needs of a broader, more diverse population" (Harriman and Daugherty, 1992, p. 26). These authors provided ideas for changing the staffing patterns of Extension.

Chesney (1992) writes that the extension delivery system must be updated to operate in our changing environment. Chesney concluded that Extension will be unable to maintain its competitive edge in delivering research-based agricultural and natural resources knowledge and practices if there is not an adequate human resource base, increase in training and technical support, and increase of skills in high technology. Graf (1993) stated that:

> "Shrinking resources haven't convinced state and federal Extension leaders to devote adequate resources to marketing, media, and technology. Extension must realize these are the basic tools necessary for Extension to support and deliver programs in this technological age" (p.30).

Dik and Travieso (1986) in their article in the Yearbook of Agriculture hypothesized what a typical workday using a variety of communication and information technologies would be like for an Extension agent in 1990. By 1990 some agents were using all the technologies mentioned by Dik and Travieso, yet others were using only a small portion of the technology available to them during a typical workday. That year has come and gone; even then they were emphasizing computers and information playing major roles.

Extension professionals need many skills. Most prevalent now are the skills needed to actively seek and transfer information electronically. Competencies that are essential to successful Extension professionals are not described in the literature. However, there is a need to know what competencies are important and how to best achieve them. Future Extension professionals and the Extension Service's future hiring practices could benefit from knowing which specific competencies are important. Position descriptions and job advertisements could be adjusted according to the study's findings.

The information from this study should impact on other areas as well. Future training sessions for Extension professionals may be modified according to the study's conclusions. Also, the results may be used for justifying the allocations of money to training sessions and impact on the curriculum and/or content of courses in university extension education programs.

Objectives

To fulfill the purpose of this study, the following objectives were identified. Extension professionals were surveyed to determine the:

(1) Perceived level of importance of selected information-related competencies needed for electronically acquiring and disseminating information;

(2) Perceived level of knowledge of selected information-related competencies needed for electronically acquiring and disseminating information;

(3) Priority for training of information-related competencies based on the weighted discrepancy score;

(4) Preference of instructional method used for information-related competencies; and

(5) Differences within selected demographic factors influenced by the mean weighted discrepancy score.

Definitions

(1) Information literacy---the ability to acquire and effectively evaluate information for a given need (Tessmer cited in Breivik, 1985).

(2) Information technologies---delivery systems for digitized information, such as the Internet, CD-ROM, expert system, satellite and interactive video.

(3) Transfer information---a "packet" of information to be transmitted through electronic channels to an agent, client, or other specialist.

(4) Network---a group of computers connected together so they can transmit information to one another. There are two kinds of network: local networks and remote networks (ES-USDA and ECOP, 1992).

(5) Internet---a global connection of interconnected local, mid-level, or wide area networks (ES-USDA and ECOP, 1992); the Internet includes such networks as NREN and NSFNet.

(6) Electronic mail---the transmission of messages over a communication network. Electronic mail, or email, is a computer-to-computer (or terminal-to-terminal) version of interoffice mail or the postal service (Woodcock and Microsoft Press, 1991).

7) Computer-administered surveys---surveys produced and administered in electronic format, also known as electronic surveys. The survey can be administered on a single computer terminal or over a network.

(8) Extension professionals---personnel employed by the Montana Extension Service (MES): agents, specialists, regional directors, and administrators.

(9) Discrepancy score---the difference between the level of importance and the level of knowledge given to a competency (Borich, 1980).

(10) Weighted discrepancy score---multiplication of the average importance score by each discrepancy score of each competency; also known as WD, competency ordering, competency ranking, or priority score (Barrick and Doerfert, 1989).

Assumptions

(1) MES professionals need training in gathering and transferring information through electronic dissemination channels.

(2) MES professionals are utilizing electronic channels to find information.

Limitations

(1) The use of an email survey for data collection limits the population because of the compatibility of computer systems.

(2) The survey was sent to MES professionals employed by Montana Extension Service at the time the study was conducted.

CHAPTER 2
REVIEW OF LITERATURE

The literature review covered four sections: (1) introduction, (2) future roles and skills, (3) technologies in use, and (4) computer-administered surveys. The first three sections laid the basis of the study, supporting the need for the study. The computer-administered survey section gave credence to the methodology.

Introduction

As the third millennium approaches and nations merge into a global economy information has become increasingly important to businesses and individuals. Kong and Goodfellow (1988) wrote that:

> "Information is now viewed as a strategic resource, by both corporations and individuals. Participants in the global economy seek the most current and relevant information to make the most timely and cost-effective decisions. Increased access to information has paralleled an increase in demand for information. However, consumers must now learn to cope with two major obstacles of the information age: information overload and information complexity. The key problem that information consumers face is organizing and sifting through information to find what is usable and relevant. Uncontrolled and unorganized information is no longer a resource" (p. 207).

Rural information was discussed as a political issue by Christianson, Maurer, and Strang (1994) as being controlled by the political elite, which includes academe. Data and information has traditionally been applied to agriculture by the U.S. Extension Service (ES) acting as intermediary. Information is important in the U.S., yet drastic

changes in how it is handled have occurred in 60 years. The ES needs to continually meet this challenge of change, which is explained later in this chapter.

Extension Service, at the national level, acknowledges the need to manage information. ES, also, identifies the need for people to become 'information literate' (Greiner, Cain, and Hodges, 1992). Information literacy is the ability to access and effectively evaluate information for a given need (Tessmer cited in Breivik, 1985). Harriman and Daugherty (1992) saw the impact of the information age on Extension structure and staffing as:

> "The information explosion and accompanying communications technology have hit head-on with the way Extension has traditionally done business. The computer has transformed education as radically as the printing process once did. Extension publications may become an archaic method of delivering information. Satellite communications make it possible to bring national experts into local communities at little cost. Telecommunications networks have barely been tapped by Extension as tools for information dissemination" (p. 26).

A large-scale survey was conducted in 1988 by LaRose and Mettler to answer the question of who uses information technologies in rural America. Their findings suggested that "with the exception of cable television, rural residents are just as likely as non-rural residents to have a wide variety of telecommunications technologies in their homes" (p. 56). Rural residents are as familiar with computer technologies as non-rural residents, yet fewer rural residents use telephone technologies, e.g. answering machines.

Future Roles and Skills

The F-A-C-T Future Application of Communication Technology report (ES-USDA and ECOP, 1991) identified five emerging trends they expect to have

strong influence on the future ES. Networking, globalization, restructuring, pluralism and automation are trends emphasized by ES throughout the report. This report stated that these trends should be considered in any long-range communication, information, and technology strategic plan.

> "This report contends that if CES is to survive and thrive into the next century it must view itself as a sophisticated information processing system. To do that, it must examine how people within the organization currently acquire, interpret, generate, access, distribute, and store information. And, it must commit to Systemwide improvements in infrastructure, staffing, training, audience targeting, and support to operate in the new environment" (F-A-C-T, p. 1).

Changing Roles

Periodically, the Journal of Extension has a column "Futures," devoted, as the title would imply, to the future of Extension. Within this column, writers project what Extension needs to do to be successful in the 21st Century. Harriman and Daugherty (1992) suggested that with under two percent of the U.S. population engaged in production agriculture, Extension must be an organization staffed to meet the needs of a broader, more diverse population. Harriman and Daugherty provide ideas for changing the staff profile of Extension, not necessarily personnel, but changing how staff does business and what kind of expertise that staff should possess. These suggestions included information centers that provide immediate access via technologies to national databases to answer both common and uncommon questions. Harriman and Daugherty, also, pointed out staffing patterns to reflect client need for information or for education.

Extension professionals must have expertise in communication and computer technologies. Along with such high-tech skills, interpersonal and public relations will continue to be critical. Chesney (1992) wrote that the extension delivery system needs

to be updated to operate in our changing environment. Chesney concluded that Extension will be unable to maintain a competitive edge in delivering research-based agricultural and natural resources knowledge and practices if there is not an adequate human resource base, increase in training and technical support, and increase of skills in high technology. The seriousness of the situation is accentuated by Graf (1993) when he says that:

> "Shrinking resources haven't convinced state and federal Extension leaders to devote adequate resources to marketing, media, and technology. Extension must realize these are the basic tools necessary for Extension to support and deliver programs in this technological age" (p. 30).

Patton (1985) reinforced the mission of ES as one of getting its clients to apply knowledge and use information. The emerging global economy forces this mission to the forefront for Extension's clients. To be successful in any market, the client needs current, up-to-date information. Telecommunication links allow for this type of information to be available immediately. These clients must be able to apply new knowledge and technologies to stay competitive in a diverse global economy. ES can help clients retrieve and apply current, up-to-date information. The basic mission of ES may not change, but it must approach the mission using new technologies in order to be successful. ES-USDA and ECOP's F-A-C-T Future Application of Communication Technologies report (1991) said that the emerging trends of communication and information technologies have vital roles in ES.

Feller (1984) discovered in his research that the role of Extension Specialists had been changing with the times. During the early 1980s, Specialists became members of academic departments and more involved in research itself rather than just disseminating research findings. Harriman and Daugherty (1992) noted that throughout the years the ES has been an unbiased organization and a source of

impartial information and help. No matter to what role ES advances such impartiality needs to continue. Harriman and Daugherty, also, suggested that Extension professionals need to continue developing skills such as excellent communication, personal and public relations. This is vital for the 21st century, no matter what future roles these professionals play. The point is that "...extension services have been forced to adapt to the emergence of electronic dissemination channels while still making active use of print and face-to-face communication mechanisms" (Shill, 1992, p. 313). Greiner, Cain, and Hodges (1992) wrote "we in extension must continually remember our grass roots support as we develop new technology to assist us in our primary purpose--serving our clientele" (p. 472). ES must keep its integrity and its basic mission while adopting new methods of reaching their clientele.

Predictions

Significant predictions have been made by Long and Long (1984), Elliott (1985), and Dik and Travieso (1986). Long and Long (1984) gave direction in regard to the microcomputer,

> "we have a newer listening tool--the microcomputer. It can help us listen to researchers comprehensively, efficiently, purposefully. It can help us listen to clientele with more insight and with more power to integrate timely research with their goals and resources. It can help us listen to colleagues who have experimented and reported their experiences. Extension is not so old that it needs a hearing aid to amplify the signal! But it does face the challenge of using a newer tool to listen more sensitively to people's problems, research- and experience-based alternatives, and co-workers. We can extend our power to hear if through microcomputers we choose to extend our listening" (p. 25).

Elliott predicted that all levels of ES would be networked by computers. In 1993 networked Extension offices were common. In their article titled "Agricultural

Agent of the Future," Dik and Travieso (1986) described a day at the office for an Extension Agent in the year 1990; included were many modern communication and information technologies such as portable computer, email, voice-mail, national network, teleconferencing, expert systems, mobile phone, and interactive videodisc. These new technologies are now in offices across the nation, yet most offices have only one or two of these technologies, not all of them as Dik and Travieso foresaw. Of course, no one can accurately predict the future, even though many try. Such predictions are helpful, however, in that they provide direction. Dik and Travieso (1986) in another article make a point that is relevant to future roles of ES: "...a new influence has come to the point of changing research and extension programs radically. This new force is information power" (p. 272). Their point reinforces the need for information in order to stay competitive in a global economy.

Mims, Novak, Simpson, and Davis (1992) suggested that "new communication technologies will allow for more information to be available to Extension and to its clientele than it has ever readily had before" (p. 622). "To access the information and become brokers of information, the Extension professional will need to know how to use appropriate information technology in finding the information" (p. 623). Extension can justify the adoption of these new processes as the need for current and relevant information is demanded by their clients.

Skills Needed

The assessment of need for certain skills is based on the anticipated role of Extension in the future. The role and skills of Extension professionals must go hand-in-hand in order for the profession to be successful. The ES must constantly train its

personnel in new information and communication technologies. Mims, Novak, Simpson, and Davis (1992) stated that:

> "training users on technology is a necessary component of technology adoption and should be included as part of the implementation process. To use new technology to its fullest, Extension professionals must understand why a particular technology is more useful than the more traditional information delivery methods" (p. 626).

ES-USDA's Future Application of Communication Technologies (FACT) committee (1992) found that there was a need to increase staff knowledge and skill in communication and information technology. The committee members believed that all states should include education/training as a component of their strategic communication, information, and technology plan. Another point made by Mims, Novak, Simpson, and Davis (1992) was that "easing the pain of adopting new technology is not easy, but careful attention to the users' needs will prevent adoption failure or sluggish adoption" (p. 627).

Summers (1993) found that out of 309 respondents to his survey of the 1992 readership of the Journal of Extension, "75 percent reported use of the computer for communication purposes including email and INTERNET, but only 39 percent reported use of the computer to access databases..." (p. 7-8). He also found "respondents indicated they generally are frequent users of email but only about one-third are frequent users of Internet or Almanac" (p. 8). Summers concluded that:

> "since a sizable number of Extension staff indicate a basic lack of knowledge or use of electronic communications and data base accessing, increased training will be needed to enable staff to develop requisite knowledge and skills in electronic communication..." (p. 12).

Information technologies can play a large role in the future of ES. Nevertheless, ES at all levels needs to be convinced to use these technologies even though its effectiveness has been demonstrated over and over again. The tools of

information technology are necessary for ES success. However, using them will not guarantee success. Information technologies only support or facilitate the efforts of ES to do its business of acquiring, evaluating, and disseminating information.

Technologies in Use

Through the efforts of the national ES, state level Extension personnel are adopting information and communication technologies as useful tools to satisfy client needs. Pennsylvania Extension agents and specialists have used PENpages as an information delivery tool for Extension staff since 1984, and for public access since 1985. The Alabama Cooperative Extension Service has implemented a statewide Extension computer network called ACENET. ACENET delivers "large quantities of timely information to staff and clientele alike in an efficient and easy to use manner" (Davis and Simpson, p. 514). Two Iowa State University Extension offices are using a fulltext information database for storage and retrieval of their publications and files (Greiner, Cain, and Hodges, 1992). Iowa Extension has a statewide computer network, EXNET. Trent and Kephart (1990) wrote on the benefits of electronic delivery of Extension publications to Idaho farmers. They list speed and ease of retrieval of information, reduction of publication costs and storage problems, and recreate slide images on the computer as benefits of the program. University of Wisconsin Extension Service has an almanac server available with the Journal of Extension back issues and current issues of the Journal of Extension are available through Virginia Tech's almanac server (Attention authors and readers, 1993, p. inside front cover). Other Extension Services are making Internet servers or computer networks accessible for practice or application.

A wide variety of sources included in the bibliography New Communications Technologies in Agriculture: a bibliography compiled by Hayes (1993) covered telecommunications, computers, and communication systems. This three volume set represented the importance published literature put on information technologies in the late 20th century.

Computer-Administered Surveys

Rosenfeld, Doherty, Vicino, Kantor, and Greaves (1989) have written that

> "Computers have been used as a means of assessment on psychological instruments for over two decades. During the 1960s, clinicians began using computers to administer and score standardized psychological tests, such as the MMPI. .... The advantages of computerized psychological testing attractive to clinicians (e.g. ease of administration and scoring, increased accuracy and standardization, time savings) are also true of its applications to other areas. Only recently, however, have researchers within social, behavioral, and management sciences utilized computer technology to administer surveys and questionnaires" (p. 147).

Electronic surveys can be used to reveal behavior of people who use computers as a communication mode. Computer-administered survey, as a concept, covers many different types of computerized surveys. Most of the literature is about a survey programmed on one computer terminal that one person uses at a time. Sproull (1986) wrote a comprehensive article on using a computer-administered survey simultaneously sent by email to multiple computer users.

Sproull's email survey produced higher response rates at a lower cost than either paper questionnaires or one-on-one interviews. The average time for responses to electronic survey was half as long as conventional surveys. Sproull recommended sending hard paper copy of letters before the survey with a signature endorsement on

letterhead to improve status and legitimacy. Follow-ups were sent via email instead of the traditional mail postcards. One drawback Sproull encountered was that in an email survey, respondents must be motivated to respond. Kiesler and Sproull (1986) found that electronic surveys lacked social context information. Another drawback discovered by Sproull (1986), Kiesler and Sproull (1986), Rosenfeld, Booth-Kewley, and Edwards (1993), as well as Rosenfeld, Doherty, Vicino, Kantor, and Greaves (1989) was that computer-administered surveys are limited by organizational locations, computer equipment, and different networks. The respondents must be familiar with and have access to an electronic mail system.

Sproull's findings have proven to be consistent with what others have discovered. Rosenfeld et al. (1993) followed Sproull's suggestions and obtained more relevant findings in support of computer-administered surveys. Rosenfeld et al. (1993) felt that if an organization was linked to an existing email system such as BITNET or the Internet, then it would be possible to conduct a low-cost electronic survey. Rosenfeld et al. (1993) suggested their "own experience recommends computer surveys as a preferred mode for sample sizes of 500 or less" (p. 495); level of response on surveys applied either by computer or paper were nearly identical, and internal consistency and reliability (coefficient alpha) of psychological and organizational scales were very similar.

Kiesler and Sproull (1986) came up with similar results corroborating that paper and electronic surveys show considerable similarity, as did Rosenfeld et al. (1993, p. 506). In fact, Booth-Kewley, Edwards, and Rosenfeld (1992) discovered that respondents found the computer format more interesting. Rosenfeld, Doherty, Vicino, Kantor, and Greaves (1989) studied three different microcomputer systems effects on an electronic survey. Rosenfeld et al. (1989) found that a computerized survey "administered on virtually any type of computer in general use today can

produce...responses at least as reliable and valid as would be obtained if paper and pencil were used" (p. 153).

The literature clearly supports the success of computer-administered surveys. Using this methodology to obtain data should not adversely affect the conduct of reliability of the study adversely. It will be monitored and the same steps that Sproull (1986) suggests and Rosenfeld et al. (1993) applied will be used.

CHAPTER 3
METHODOLOGY

The study was designed to determine the information-related competencies and training needed by Montana Extension Professionals when acquiring and disseminating information to clients electronically. The methods and procedures to be used in the study are described in this chapter. The methodology chapter was organized into five sections. These were (1) population description, (2) instrument design, (3) data collection, (4) data analysis, and (5) summary.

A descriptive study was planned based on a design described by Borg and Gall (1989). The intention was to perform a needs assessment that describes the current situation and to answer the objectives of the study.

Population Description

The researcher requested and received verbal permission and endorsement from the Associate Director of Montana Extension Service, Andrea Pagenkopf, to survey MES professionals. The population consisted of specialists, county agents, and administrators employed by the Montana Extension Service. County agents included agriculture agents, home economists, and 4-H agents. Paraprofessionals and secretarial staff were excluded from this study. Specialists were chosen by their formal Extension title, i.e., range specialists. Area Administrative personnel directly employed by the MES were included in the study. This study excluded county and university

department administrators. Names and addresses were obtained from a directory titled County Extension Agents, printed by the MES Office of the Director in September 1993; the directory has a comprehensive list of all staff and faculty involved with MES. Names from the directory were placed into the appropriate group for the study. All lists were compared and duplicated names removed to avoid selection error.

There were 36 Extension specialists, 80 County agents and 6 Extension administrators for a total population of 122. Since the population consisted of 122, a total census was taken.

Instrument Design

The basic design for the survey instrument followed Dillman's (1978) Total Design Method (TDM). Neither Dillman nor the researcher had any experience with computer-administered surveys, so trial surveys were sent by the researcher to members of the researcher's graduate committee. Based on these trial tests, it was concluded that specific directions would be needed depending on the email system available to the respondent.

Another trial test was conducted between the researcher and the researcher's colleagues. The colleagues all use email but there was a vast disparity of email skills among the group. The second trial test helped to determine format and layout of the instrument. Dillman highly recommended placing the response categories and numbers in a vertical format with the response space to the left of the category. The researcher found that this format can be used if specific directions are given to NOT use the return/enter key after placing the answer on the line. The directions told the respondent to use the arrow keys to move one line at a time. This strategy allowed the

respondent to answer a question and move down to the next question without adding numerous, blank lines to the survey instrument. The researcher, also, discovered that the layout of questions was not as crucial in email surveys as in paper (mailed) surveys. Unless the researcher knew that the respondents all had the same computer software and hardware to work with, the researcher could not control page breaks, fonts, and characters per line.

Sproull (1986) suggested that a researcher should send a cover letter in hard copy, because sending it electronically lost the effects that Dillman promoted. These effects include letterhead and a signature from someone with authority in the organization who would influence response rates. This researcher heeded Sproull's advice on sending a hard-copy cover letter. Along with the cover letter, a set of directions was sent that exactly matched the directions sent with the email survey. Sproull recommended this tactic for the infrequent user of email, and this was confirmed during one of the trial tests the researcher carried out. These recommendations were followed in an effort to control non-response error.

The survey was divided into three sections. The first section listed 37 competencies. The competencies were developed from competency items and other questions derived from the review of related literature and experience of the researcher. One tool that listed competencies developed by Nat Jaeggli (1993), MES Computer Applications Specialist, was used with his permission. The competencies taken from this source had been taught at least once to all agents in the survey population by Jaeggli. These competencies were further developed during the trial test runs conducted prior to the pilot test. Of the 37 competencies, 26 encompassed the information technologies used for transferring information and 11 competencies covered factors relevant to information in electronic format. The group of 26

competencies could have been grouped into more specific categories. The first four competencies covered telecommunication hardware and software packages. The next two, numbers 5 and 6, were email competencies. There were thirteen competencies encompassing the Internet protocols. Seven competencies covered a variety of information technologies and their uses.

The respondents were asked to rate the 37 competencies' importance on the left side and rate their knowledge of the competency on the right hand side using a five point (one through five) Likert-type scale. The scales were weighted so that the numbers represented the following: one = not important; two = less important; three = somewhat important; four = more important; and five = very important. For knowledge of the competencies, the ratings were: one = no knowledge; two = little knowledge; three = somewhat knowledgeable; four = more knowledgeable; and five = very knowledgeable. This structure was based on Borich's (1980) needs assessment model. Importance ratings minus knowledge ratings yields a discrepancy score for each competency from each respondent. The discrepancy scores are then weighted by multiplying the average level of importance by the discrepancy score of each competency. The weighted discrepancy scores (WD) allowed for a low discrepancy-scored competency with a high-level of importance to rank higher than a high discrepancy-scored competency with a low-level of importance. Any WD above zero could mean that more training on the competency would be appropriate. The higher the positive WD of a competency, the higher the priority of training should be given that competency. This score can be contributed to the effectiveness, or lack thereof of prior training, lack of training, or respondent's familiarity with the information technology competency through another source, i.e., professional organizations. The weighted discrepancy score can be used in planning future training of competencies.

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The second section covered questions on preferences of instructional method and training. Six questions encompassed instructional method preferences, taken from Ballard's (1989) study. The presentation style or format of training sessions could be constructed or modified based on the responses to this series of questions. Four questions covered previous training received by respondents and how they would prefer future training sessions, i.e., length and frequency. These responses can, also, influence the nature of future training sessions.

Five demographic questions (with parts) comprised the last section. These related to gender, age, position, education level, years in the profession, years in current position, and membership in organizations. Data on the respondents membership in organizations was gathered to determine if belonging to state or national-level organizations correlated to responses.

The last two questions asked respondents if they wanted a copy of the results of this survey, and what their comfort level was in answering an email survey. This last question was added as a result of the pilot study. The final questionnaire (Appendix C) contained 53 questions, and required about 20-25 minutes to answer. The length of time was an average obtained from pilot test respondents. A point made by a pilot test respondent was that the person who is less familiar or comfortable with email would take longer to fill out the survey.

The instrument was pilot tested on 14 participants, 13 randomly selected people from the population; one was an administrator, four were specialists, and eight were agents. The fourteenth person was the Director of Evaluation Studies, under the Extension Service in another state. On December 2, 1993, a cover letter and copy of the directions were sent to the 14 selected participants. The cover letter was signed jointly by Andrea Pagenkopf, Director of Montana Extension and the researcher on

departmental letterhead. The survey and a second set of directions were sent via email on December 8, 1993. The pilot respondents were asked to return the completed survey with any comments via email by December 22, 1993. Two email follow-ups were sent; the first one on December 14, 1993, and the second on December 20, 1993. The second follow-up included a copy of the survey and directions. This strategy was followed because the researcher found it was possible for respondents to delete an email message and not realize it was the survey. The first follow-up increased the response rate from 35.7 percent to 57 percent. The second follow-up brought the pilot response rate up to 92.8 percent.

Sproull (1986) had reported that response turn-around time can be less when using an electronic survey. Two weeks were given for the survey to be returned. The response rate was 92.8 percent, confirming Sproull's findings. In all other aspects, Dillman's TDM worked well for this computer-administered survey.

Of the 14 pilot surveys sent, 13 were returned for a response rate of 92.8 percent. Even though respondents were asked to do the survey electronically and return it that way, six came back via postal mail for a 46 percent postal mail return rate. The researcher's address was neither given in the cover letter nor in the email survey or follow-ups, so as not to promote surveys being returned by regular mail. The postal surveys arrived with a variety of addresses, yet they all managed to reach the researcher. There were seven pilot responses returned by email for a 54 percent electronic mail return rate. The one non-respondent did send an email message stating computer problems were preventing the completion of the survey.

Reviewers were asked to evaluate the instrument for editorial or appearance changes, and to review the directions and questions for ease of response, clarity, or ambiguity. No major changes were suggested. Respondents felt the time of 20-25

minutes was accurate for completing the survey. The directions were determined to be useful and easily understood. One question from the pilot test was added to the final survey asking about the respondents comfort level on answering an email survey.

Data Collection

For the pilot test, 13 professionals from this census were queried. They were not duplicated in the census population study done in January of 1994. On January 5, 1994, the cover letter (Appendix A) and directions (Appendix B) were sent on Agriculture and Technology Education Department letterhead bearing the signatures of Andrea Pagenkopf, Director of Extension and the researcher. The email survey and directions were sent January 10, 1994, three working days after the cover letter was sent. This delay allowed time for the letter announcing the survey to arrive. Two email follow-ups were sent seven working days apart, the first one (Appendix D) on January 26, 1994. The second follow-up including the survey (Appendix E) was sent four days before the deadline. Both follow-ups generated more returns. By sending follow-ups on email, the researcher could use a shorter turn around time and send the last one closer to the deadline than would have been possible with mailed postcards.

The return rate on the census survey was 78.9 percent; 86 of the 109 surveyed responded. These figures do not include the surveys returned during the pilot test. From the agent stratum, 59 of 72 responded for 81.9 percent return rate. Twenty-six of the 32 specialists responded, an 81.3 percent return rate for the stratum. The administrator stratum had such a low response rate that group was discarded from the study. One administrator out of the five responded. Another administrator gave the survey to someone else for response, which made that return unusable This response

rate is not representative of the population, so the researcher elected to discard the administrator stratum from the results. This change in population altered the overall response rate from 78.9 percent to 81.7 percent; 85 of the 104 responded. The individual stratums were not affected. Further reporting of the statistics did not include the administrator's stratum. Of the 85 returned, 47 came in via email (55.3 percent) and 38 came through the postal mail (44.7 percent). As in the pilot test, the address of the researcher was not given, but the surveys nevertheless arrived with a variety of addresses.

A random sample of non-respondents was taken after the February 11, 1994 deadline. Of the non-respondents, 10 percent were pooled, which came to three people. As in the pilot test, this was divided up among the three stratums, agents, specialists, and administrators. Two non-respondents were contacted by telephone and the completed survey was sent back to the researcher. The agent sent the survey via email and the specialist sent the survey through postal mail. The third, an administrator, was contacted by telephone, then a copy of the survey was sent via email to this person. The administrator sent an email message back saying that time was too precious to be used on an email survey. The lack of response by the administrator here, also, contributed to the elimination of the stratum from the survey results.

Data Analysis

Responses from the survey were entered into a dbase file using DBASE III. The personal computer version of the Statistical Package for the Social Sciences (SPSS/PC+) was used for analyses (Norusis, M.J. & SPSS, Inc., 1988). Using

SPSS/PC+, the data were "cleaned" by running the procedures FREQUENCIES and LIST to identify variables outside appropriate ranges.

Reliability coefficients, using the data set from the 37 competencies, were computed. Cronbach's alpha coefficient, calculated as part of the One-Way ANOVA procedure by SPSS/PC+, was used as an indication of the reliability of the competencies. Thirty seven competencies and 90 responses (less than the total due to missing values) computed an alpha of 0.9451. The alpha (0.9451) showed a high correlation, therefore the competencies were considered to be sufficiently reliable for the study.

Frequencies, means, and standard deviation for each question was run for the entire population. Frequencies were run for the six questions pertaining to instructional method style preferences and future training preferences by each stratum, agents and specialists. The administrator stratum was not included in these data analysis. Data analyses were done on the 37 competencies. First, discrepancy scores for each competency were calculated by subtracting the knowledge rating from the importance rating for each competency from each response, followed by the computation of the weighted discrepancy scores. Weighted discrepancy scores (WD) were calculated by multiplying the discrepancy score of each competency from each response by the average importance score for each competency. Frequencies, means, and standard deviations were run for importance, knowledge, and WD of each competency for each stratum.

T-tests or analysis of variances, using the significant difference level of 0.05, were run for each WD against different demographics. Demographics by years in the profession, years in current position, degree held, or organization memberships showed no statistical significance. The analyses were run against age, email versus regular

postal mail return method, comfort level in answering an email survey, by agents by method of returning the survey, and by specialists by method of returning the survey.

Respondents were classified as early, middle, or late respondents. The data of Table 1 reveal the characteristics that 41 (43%) of the respondents returned the survey before the first follow-up email was sent. Thirty (31%) of the returns were received between the first and second follow-up. Any survey received after the second follow-up was a late return. Of the responses received, 25 (26%) were in this late category and included the responses from the double dip.

Table 1. Return rate by date of return. (N = 96)

Date returned	N	%
Early return	41	43
Middle return	30	31
Late return	25	26

Analysis of variance was computed on these three sub-population groups. The analysis revealed a very small number (one question) of significantly different means between the groups. Once again, the low numbers are attributed to expectation of random significance, rather than actual significant difference in the data.

Summary

This was a descriptive study of information technologies used by Montana Extension professionals. The population was stratified by Montana Extension professionals and consisted of administrators, specialists, and agents.

An email survey, prepared in part using the Total Design Method (Dillman, 1978), was used as the data collection instrument. Thirty seven competencies were identified and set up as a needs assessment model (Borich, 1980). A pilot study was used to validate and test the instrument. Assurance of the needed sample size was provided through two follow-up email messages to non-respondents. The double dip technique was employed to assure non-respondents were no different than other respondents.

Responses to questions were analyzed by a personal computer statistical package. Reliability coefficients were computed using Cronbach's alpha. The computed alpha was 0.9451 of the thirty-seven competencies. Frequencies, means and standard deviation was calculated on each question in the survey. Weighted discrepancy scores were computed for the 37 competencies. The data were tested by t-test and analysis of variance at the 0.05 significant level. The data were used to determine any differences among selected demographic features and rank ordered the competencies based upon the respondents perceived level of importance and knowledge. The data were, also, used to determine instructional method and training preferences related to information technologies.

CHAPTER 4

RESULTS OF THE STUDY

The study was designed to determine the information-related competencies and training needed by Montana Extension Service professionals to acquire and disseminate information to clients electronically. The results of this study are presented in 6 sections: (1) demographic data, (2) perceived level of importance, (3) perceived level of knowledge, (4) priority for training based on mean weighted discrepancy scores, (5) differences within selected demographic factors, (6) preference of instructional methods, (7) comments provided by the respondents, and (8) summary.

Some respondent's surveys were improperly completed, so the total number for each data analysis was not always equal to 96, i.e. six respondents did not indicate their age (N = 90).

Demographic Data

The data arranged in Table 2 show that the electronic mail survey was sent to 122 Extension professionals. The return rates for agents, specialists, and administrators can be found in Table 2.

Table 2. Return rates for respondents.

Response Group	Number Sent	Number Returned	Percent Returned
Agents	80	66	82.5
Specialists	36	30	83.3
Administrators	6	2	33.3
TOTAL	122	98	80.3

The date in Table 2 indicate that of the 122 surveys sent, 98 (80.3%) were returned. Of the 80 agents polled, 66 (82.5%) returned the survey. Two agents did call the researcher indicating there would not be a response from them because of time constraints. Surveys were returned by 30 of the 36 specialists, for an 83.3% return rate. An administrative assistant, who works for three specialists, notified the researcher that she took care of all the email and the specialists had nothing to do with email. She filled out the survey for the three specialists, which made the completed survey unusable. One other specialist sent an email message saying other commitments would not allow them to respond to the survey.

In the Administrator stratum only two (28.6%) of the seven returned surveys were usable. One administrator gave the survey to another person who did complete the survey. This person noted that the administrator had given them the survey to answer. For the double dip technique, the administrator could not commit the time to answering a survey. Due to the number of usable returns (n = 2), the Administrator stratum is not included in the result's data.

The returns were divided by gender and on this basis, 34 (35%) responses were from females and 62 (65%) returns were from males.

The data in Table 3 reveal the method by which agents and specialists returned the survey. The agent stratum had 40 (41.7%) respondents return the survey via email

and 26 (27.1%) through regular postal mail. The specialists returned 13 (13.5%) of the surveys via email. Seventeen (17.7%) of the specialists returned the survey by regular mail. Of the 96 returns, 53 (55.2%) were returned via email and 43 (44.8%) came back through the regular mail.

Table 3. Method respondents used to return the survey.

	Agents		Specialists		Total	
Method of return	n=66	%	n=30	%	N=96	%
Email	40	41.7	13	13.5	53	55.2
Regular mail	26	27.1	17	17.7	43	44.8

As revealed by data in Table 4 the Masters degree group had the most respondents, 42 (44%). The respondents with a bachelor degree were the second highest group, 31 (32%). Twenty-three (24%) respondents hold a doctorate degree.

Table 4. Distribution of degree held by the respondents. (N = 96)

Degree held	n	%
Doctorate	23	24
Masters	42	44
Bachelors	31	32

Data arranged in Table 5 show the distribution of respondents by age. Of the 96 returns, 31 (32.3%) fall into the 36-45 years of age grouping. The highest return rate was in the 46-55 age category, thirty-three (34.4%) resondents. Six (6.3%) respondents did not divulge their age for this survey.

Table 5. Distribution of age of the respondents. (N = 96)

Age	n	%
24-35	16	16.6
36-45	31	32.3
46-55	33	34.4
56 and older	10	10.4
Missing	6	6.3

The data in Table 6 indicate respondents' returns by years in the Extension profession. Twenty-five percent (n = 24) of the respondents have been in the Extension profession from 1 to 5 years. Both categories of 21 to 25 years and 26 or more years in the profession each had 12 (12.5%) respondents. A total of three respondents did not indicate the years of experience.

Table 6. Distribution by years of service in the Extension profession of the respondents. (N = 96)

Years in the profession	n	%
1-5	24	25.0
6-10	15	15.6
11-15	16	16.7
16-20	14	14.6
21-25	12	12.5
26 or more	12	12.5
Missing responses	3	3.1

The data represented in Table 7 are the return rates by years of service in the current position. The respondents who fit the first category, 1-5 years in the current position, returned 43.7 percent (n = 42) of the surveys. Of the 96 Extension professionals surveyed, seven (7.3%) have 16-20 years in the current position and eight (8.3%) respondents had 21 years or more years in their current position.

Table 7. Distribution by years of service in the current position of the respondents. (N = 96)

Years in current position	n	%
1-5	42	43.7
6-10	14	14.6
11-15	21	21.9
16-20	7	7.3
21 and over	8	8.3
Missing responses	4	4.2

The data in Table 8 cover information about respondent's memberships in organization. The membership information was obtained to compare if belonging to an organization made any difference of respondent's experience or knowledge of information technologies. Five categories were listed on the survey ranging from local or county organizations to International organizations.

Table 8. Respondent's memberships in different organization levels. (N = 96)

	Local/ County		State		Regional		National		Inter-national	
Belong to	N	%	N	%	N	%	N	%	N	%
1-2	29	30	58	60	24	25	59	69	11	11
3-4	14	15	20	21	3	3	18	18	0	
5 or more	5	5	1	1	1	1	1	1	0	
None	48	50	17	18	68	71	18	19	85	89
Mean	1.18		1.64		0.47		1.54		0.16	

The numbers presented in Table 8 indicate the number of organizations respondents belong to for any given level. The data in Table 8 indicate that 50 percent (n = 48) of the respondents do not belong to a local or county organization. Thirty percent (n = 29) belong to one or two local or county organizations. Local or county organization membership has a mean of 1.18. Membership in state level organizations

has the highest mean, 1.64. Only 17 (18%) respondents do not belong to a state organization. The category of belonging to three to four state organizations had 20 (21%) of the respondents. Sixty percent (n = 58) of the respondents belong to 1 or 2 state organizations. Sixty-eight (71%) of the respondents did not belong to a regional level organization, while 24 (25%) belong to 1 or 2 regional organizations. The regional organization membership mean was 0.47. National level organizations had the highest memberships, 59 (69%) of the respondents, in one or two organizations. The mean for membership in national organizations was 1.54. International organizations had the smallest membership of Montana Extension professionals, which had a membership mean of 0.16. Eighty-nine (n = 85) percent of the respondents did not belong to an international organization, while 11 (11%) of the respondents belong to one or two international organizations.

Table 9. Respondent's level of comfort in answering an email survey. (N =96)

Comfort level	n*	%
Not comfortable	32	33.3
Less comfortable	11	11.4
Somewhat comfortable	19	19.8
More comfortable	11	11.4
Very comfortable	23	24.1

* Mean = 2.81.

The last table of data, Table 9, in the demographic section describes the comfort level of respondents to answer an email survey. One-third (n = 32)of the respondents were not comfortable responding to an electronic survey. Eleven (11.4%) of the respondents were less comfortable, while 19 (19.8%) were somewhat comfortable in answering an electronic survey. Eleven (11.4%) of the respondents reported being

more comfortable. When replying to the electronic survey, twenty-four (n = 23) percent of the respondents felt very comfortable. The mean of respondent's comfort level was 2.81, which indicates more respondents are less comfortable using email than more comfortable.

Perceived Level of Importance

Table 10 and Table 11 represent data generated from ratings of importance. These data were calculated from each competency by the two stratums. Ratings of 1 through 5 were the choices, where 1 was not important and 5 was very important. Therefore, the higher the mean value, the more important the stratum was for that competency. The data were analyzed for mean and standard deviation (SD). All means and SDs were truncated at two decimal places. The competencies are put in rank order based on the mean importance rating. A comment (see Appendix F) from one survey makes a relevant point: "I'm not fimiliar with several of the terms and acronyms (gopher, ftp--my co-worker defined this one for me) you used in the survey. If I never heard of it, how can I evaluate its importance."

The data in Table 10 indicate that mean of importance ratings by agents range from 4.39 to 1.96. The highest competency was *follow instructions on the computer screen*, whereas the lowest importance mean was for the competency *describe gopher or veronica*. The standard deviation for the competencies vary anywhere from 1.25 to 0.82. The highest mean, 4.39, had the smallest standard deviation (SD)of 0.82. The competency with the lowest mean of 1.96 had a SD of 1.03. The twelve competencies which are describing or using the Internet protocols consistently have the lower means among the agents.

Table 10. Rank order of the competencies by importance mean as perceived by the agents.

Competencies	Mean	SD
Follow instructions on the compute screen	4.39	0.82
Exchange messages via email	4.06	0.97
Email a message that was prepared by word processing	3.92	1.01
Practice legal aspects of keeping the name of a person who requests information confidential	3.87	1.19
Use a telecommunication software package	3.84	0.99
Find electronic information resources relative to your field	3.75	1.11
Transfer a file from Internet to a floppy disk or hard drive	3.72	1.07
Search electronic resources to locate information	3.67	1.12
Load and use a CD-ROM	3.59	1.15
Recognize legal aspects of storing extra copies of information	3.57	1.21
Use satellite video	3.53	1.08
Practice legal and ethical aspects of copyright law for electronic material	3.53	1.23
Evaluate and interpret results of an information search	3.51	1.12
Use information technologies in distance education	3.51	1.12
Recognize that the quality of information varies between different publications	3.39	1.06
In preparing an electronic search, question a person in detail about the information desired	3.31	1.11
Use email in distance education	3.25	1.11
Identify hardware needed for telecommunications networks	3.25	1.15
Use synonymous terms to expand an electronic search	3.06	1.15
Demonstrate different information technologies to a community group	3.03	1.13
Use an expert system	2.92	1.22
Gather and transfer appropriate information before a request is made	2.87	1.25
Unsubscribe electronically from a news group	2.68	1.15
Use the Internet almanac	2.68	1.20
Describe telnet	2.63	1.14
Describe Internet almanac	2.60	1.12
Telnet to a remote computer	2.57	1.20
Subscribe electronically to a news group	2.56	1.06
Properly transfer a file using ftp on Internet	2.56	1.12
Subscribe electronically to a list server	2.53	1.11
Identify at least four telecommunication software packages	2.45	1.09
Unsubscribe electronically from a list server	2.45	1.09
Use the Internet gopher	2.45	1.11
Demonstrate different telecommunication software to a community group	2.33	1.14
Read electronically the Journal of Extension	2.28	1.17
Describe ftp	2.04	1.03
Describe gopher or veronica	1.96	1.03

Table 11. Rank order of the competencies by importance mean as perceived by the specialists.

Competencies	Mean	SD
Find electronic information resources relative to your field	4.26	0.98
Exchange messages via email	4.16	1.02
Search electronic resources to locate information	4.13	1.00
Follow instructions on the compute screen	3.96	1.27
Recognize that the quality of information varies between different publications	3.80	1.27
Evaluate and interpret results of an information search	3.73	1.17
Email a message that was prepared by word processing	3.70	1.26
Practice legal and ethical aspects of copyright law for electronic material	3.70	1.44
Practice legal aspects of keeping the name of a person who requests information confidential	3.63	1.49
Load and use a CD-ROM	3.59	1.29
Use synonymous terms to expand an electronic search	3.53	1.33
Use a telecommunication software package	3.43	1.43
In preparing an electronic search, question a person in detail about the information desired	3.40	1.19
Transfer a file from Internet to a floppy disk or hard drive	3.40	1.32
Use information technologies in distance education	3.36	1.37
Use email in distance education	3.26	1.55
Recognize legal aspects of storing extra copies of information	3.26	1.61
Use satellite video	3.03	1.35
Properly transfer a file using ftp on Internet	2.83	1.36
Gather and transfer appropriate information before a request is made	2.70	1.23
Use an expert system	2.68	1.19
Use the Internet almanac	2.63	1.52
Telnet to a remote computer	2.50	1.40
Use the Internet gopher	2.46	1.43
Subscribe electronically to a news group	2.40	1.35
Identify hardware needed for telecommunications networks	2.36	1.03
Demonstrate different telecommunication software to a community group	2.33	1.14
Unsubscribe electronically from a news group	2.33	1.32
Subscribe electronically to a list server	2.30	1.48
Describe Internet almanac	2.23	1.16
Demonstrate different information technologies to a community group	2.20	1.27
Unsubscribe electronically from a list server	2.20	1.42
Describe telnet	2.13	1.00
Describe ftp	2.03	1.03
Describe gopher or veronica	2.03	1.04
Read electronically the Journal of Extension	2.03	1.09
Identify at least four telecommunication software packages	1.96	1.15

The data in Table 11 indicate the mean of importance ratings by specialist range from 4.26 to 1.96. The means of importance are tightly grouped between 4.26 and 1.96. The highest competency was *find electronic information resources relative to your field*, while the lowest importance mean was for the competency *identify at least*

four telecommunication software packages. The standard deviation for the competencies vary anywhere from 1.61 to 0.93. Compared to the agents, the specialists had less variance of the SD. The highest mean, 4.26, had the lowest SD of 0.98. The competency with the mean of 1.96 had a SD of 1.15. With the exception of *read electronically the Journal of Extension*, the competencies about information, the last eleven listed in Table 11, consistently were rated higher by the specialists then the other twenty-six competencies.

Perceived Level of Knowledge

Table 12 and Table 13 represent data generated from ratings of knowledge. These data were calculated from each competency by the two stratums. Ratings of 1 through 5 were the choices, where 1 was not knowledgeable and 5 was very knowledgeable. Therefore, the higher the mean value, the more knowledgeable the stratum was for that competency. The data were analyzed for mean and standard deviation (SD). All means and SDs were truncated at two decimal places. The competencies are put in rank order based on the mean knowledge rating.

As revealed by the data in Table 12, the mean of knowledge ratings ranged from 1.22 to 3.39 by agents. *Describe ftp* had a 1.22 mean, while the competency *follow instructions on the computer screen* had a mean of 3.39. The standard deviation for the competencies vary anywhere from 0.49 to 1.44. The lowest mean of 1.22 for the competency *describe ftp*, also, had the lowest SD of 0.49. *Follow instructions on the computer screen competency*, mean 3.39, had a SD of 1.06. The competency, *practice legal aspects of keeping the name of a person who requests information confidential*, had the highest SD of 1.44 with the mean of 2.50.

Table 12. Rank order of the competencies by knowledge mean as perceived by the agents.

Competencies	Mean	SD
Follow instructions on the compute screen	3.39	1.06
Exchange messages via email	3.37	1.01
Email a message that was prepared by word processing	2.98	1.27
Transfer a file from Internet to a floppy disk or hard drive	2.60	1.28
Recognize that the quality of information varies between different publications	2.57	1.20
Practice legal aspects of keeping the name of a person who requests information confidential	2.50	1.44
Use a telecommunication software package	2.45	0.96
Load and use a CD-ROM	2.27	1.27
Evaluate and interpret results of an information search	2.24	1.04
Identify hardware needed for telecommunications networks	2.15	0.93
Demonstrate different information technologies to a community group	2.09	0.95
In preparing an electronic search, question a person in detail about the information desired	2.09	1.11
Practice legal and ethical aspects of copyright law for electronic material	2.07	1.19
Search electronic resources to locate information	2.04	0.89
Use email in distance education	2.04	0.99
Find electronic information resources relative to your field	2.03	0.84
Recognize legal aspects of storing extra copies of information	2.03	1.17
Use satellite video	2.01	1.10
Read electronically the Journal of Extension	1.87	1.00
Gather and transfer appropriate information before a request is made	1.84	1.06
Use information technologies in distance education	1.80	0.80
Subscribe electronically to a news group	1.80	1.07
Describe telnet	1.77	0.90
Identify at least four telecommunication software packages	1.77	0.90
Unsubscribe electronically from a news group	1.77	1.03
Use synonymous terms to expand an electronic search	1.76	1.02
Use an expert system	1.75	1.02
Describe Internet almanac	1.66	0.84
Subscribe electronically to a list server	1.63	0.90
Demonstrate different telecommunication software to a community group	1.60	0.82
Unsubscribe electronically from a list server	1.59	0.89
Use the Internet almanac	1.57	0.87
Telnet to a remote computer	1.36	0.71
Properly transfer a file using ftp on Internet	1.36	0.72
Use the Internet gopher	1.33	0.66
Describe gopher or veronica	1.24	0.49
Describe ftp	1.22	0.49

With the possibility of a knowledge mean to be between zero and five in Table 12, only two competencies, *exchange messages via email* and *follow instructions on the computer screen*, had a mean above 3.00.

Table 13. Rank order of the competencies by knowledge mean as perceived by the specialists.

Competencies	Mean	SD
Exchange messages via email	3.46	1.10
Follow instructions on the compute screen	3.26	1.33
Evaluate and interpret results of an information search	3.16	1.41
Recognize that the quality of information varies between different publications	3.10	1.66
Email a message that was prepared by word processing	2.93	1.36
Practice legal aspects of keeping the name of a person who requests information confidential	2.73	1.59
Use a telecommunication software package	2.63	1.29
Use synonymous terms to expand an electronic search	2.56	1.40
Practice legal and ethical aspects of copyright law for electronic material	2.56	1.52
Use email in distance education	2.50	1.28
Find electronic information resources relative to your field	2.46	1.04
Search electronic resources to locate information	2.43	1.13
Transfer a file from Internet to a floppy disk or hard drive	2.43	1.19
In preparing an electronic search, question a person in detail about the information desired	2.37	1.37
Identify hardware needed for telecommunications networks	2.26	1.04
Use information technologies in distance education	2.26	1.17
Load and use a CD-ROM	2.20	1.42
Recognize legal aspects of storing extra copies of information	2.13	1.27
Use satellite video	2.10	1.06
Read electronically the Journal of Extension	2.06	1.28
Identify at least four telecommunication software packages	2.06	1.33
Demonstrate different information technologies to a community group	2.03	1.18
Subscribe electronically to a news group	2.00	1.31
Gather and transfer appropriate information before a request is made	1.93	1.19
Unsubscribe electronically from a list server	1.93	1.28
Use an expert system	1.90	1.21
Subscribe electronically to a list server	1.90	1.26
Demonstrate different telecommunication software to a community group	1.86	1.13
Unsubscribe electronically from a news group	1.83	1.23
Use the Internet almanac	1.80	1.24
Describe telnet	1.76	1.07
Telnet to a remote computer	1.76	1.10
Describe Internet almanac	1.70	1.05
Properly transfer a file using ftp on Internet	1.66	1.06
Describe ftp	1.63	0.92
Describe gopher or veronica	1.63	1.03
Use the Internet gopher	1.56	0.97

As revealed by the data in Table 13, mean of knowledge ratings by specialist ranged from 1.56 to 3.46. *Use the Internet gopher* competency had the 1.56 mean and a SD of 0.97, while *exchange messages via email* competency had a mean 3.46 and a SD of 1.10. The standard deviation for the competencies vary anywhere from 0.92 to

1.66. The competency *recognize that the quality of information varies between different publications* has a mean of 3.10 with a SD of 1.66. The twelve competencies which are describing or using the Internet protocols consistently have the lower means among the specialists.

Priority for Training Based on Mean Weighted Discrepancy Scores

Weighted discrepancy scores (WD) were calculated by subtracting the knowledge score from the importance score and multiplying the difference by the average importance score. The WD could range from +20 to -4 after calculating the importance and knowledge ratings. Each stratum's rank order of the competencies were compiled in Table 14 and Table 15. Based on Borich's (1980) needs assessment model, training priority was given to the highest positive weighted discrepancy scores.

The data in Table 14 list the rank order of competencies based upon the weighted discrepancy score (WD) calculated according to the agents ratings. The mean WD varied from 6.76 to 0.90.. *Find electronic information resources relative to your field* competency had the highest WD of 6.76, while the competency of *read electronically the Journal of Extension* had the lowest (0.90) WD. Of the 37 competencies none had a mean WD below zero, this suggests the need for further training in all of the competencies among the agents. Six competencies have a mean below 2.00 representing a lower priority for training. The twelve competencies about the Internet protocols rank in the lower half of the order. Of the top six rank ordered competencies, five are categorized as factor relevant to information in electronic format competencies, while eight of the 11 information competencies rank in the upper half of the order. Categorized within this group of information in electronic format

competencies is the one competency given lowest rank order, *read electronically the Journal of Extension*

Table 14. Competencies in rank order by the mean WD for the agents.

Competencies	Agents Mean
Find electronic information resources relative to your field	6.76
Search electronic resources to locate information	6.23
Use information technologies in distance education	5.93
Recognize legal aspects of storing extra copies of information	5.40
Practice legal and ethical aspects of copyright law for electronic material	5.27
Practice legal aspects of keeping the name of a person who requests information confidential	5.26
Use a telecommunication software package	5.18
Use satellite video	5.11
Evaluate and interpret results of an information search	4.57
Load and use a CD-ROM	4.47
Follow instructions on the compute screen	4.26
Use synonymous terms to expand an electronic search	4.16
In preparing an electronic search, question a person in detail about the information desired	4.10
Transfer a file from Internet to a floppy disk or hard drive	4.06
Use email in distance education	3.95
Email a message that was prepared by word processing	3.62
Use an expert system	3.28
Identify hardware needed for telecommunications networks	3.20
Telnet to a remote computer	3.09
Properly transfer a file using ftp on Internet	3.08
Use the Internet almanac	2.94
Gather and transfer appropriate information before a request is made	2.90
Recognize that the quality of information varies between different publications	2.88
Exchange messages via email	2.79
Use the Internet gopher	2.76
Demonstrate different information technologies to a community group	2.60
Unsubscribe electronically from a news group	2.33
Describe Internet almanac	2.29
Subscribe electronically to a list server	2.19
Describe telnet	2.09
Unsubscribe electronically from a list server	2.05
Subscribe electronically to a news group	1.90
Describe ftp	1.68
Demonstrate different telecommunication software to a community group	1.57
Identify at least four telecommunication software packages	1.56
Describe gopher or veronica	1.43
Read electronically the Journal of Extension	0.90

Table 15. Competencies in rank order by the mean WD for the specialists.

Competencies	Mean
Find electronic information resources relative to your field	7.05
Search electronic resources to locate information	6.49
Practice legal and ethical aspects of copyright law for electronic material	4.06
Recognize legal aspects of storing extra copies of information	3.94
Use information technologies in distance education	3.81
Transfer a file from Internet to a floppy disk or hard drive	3.50
Practice legal aspects of keeping the name of a person who requests information confidential	3.42
In preparing an electronic search, question a person in detail about the information desired	3.22
Use satellite video	3.15
Use synonymous terms to expand an electronic search	3.10
Properly transfer a file using ftp on Internet	3.08
Follow instructions on the compute screen	2.98
Use a telecommunication software package	2.97
Email a message that was prepared by word processing	2.95
Exchange messages via email	2.86
Load and use a CD-ROM	2.60
Use email in distance education	2.49
Recognize that the quality of information varies between different publications	2.46
Gather and transfer appropriate information before a request is made	2.33
Use the Internet almanac	2.22
Use the Internet gopher	2.21
Use an expert system	2.16
Evaluate and interpret results of an information search	2.03
Telnet to a remote computer	1.87
Describe Internet almanac	1.32
Unsubscribe electronically from a news group	1.28
Subscribe electronically to a news group	1.00
Subscribe electronically to a list server	0.98
Describe telnet	0.90
Describe gopher or veronica	0.86
Describe ftp	0.81
Unsubscribe electronically from a list server	0.63
Demonstrate different information technologies to a community group	0.46
Identify hardware needed for telecommunications networks	0.29
Read electronically the Journal of Extension	-0.07
Demonstrate different telecommunication software to a community group	-0.14
Identify at least four telecommunication software packages	-0.23

The data in Table 15 contain the rank order based upon weighted discrepancy scores (WD) of competencies as indicated by the Specialist stratum. The mean WD range from 7.05 to -0.23. *Find electronic information resources relative to your field* competency had the highest WD of 7.05, while the competency of *identify at least four*

telecommunication software packages was the lowest (-0.23) mean. Three competencies were calculated to have a mean below zero. These competencies are: *identify at least four telecommunication software packages* (mean of -0.23); *demonstrate different telecommunication software to a community group* (mean of -0.14); and *read electronically the Journal of Extension* (mean of -0.07). Of the eleven competencies on factors of information in electronic format, four are the top rank ordered competencies. Also, seven of these information competencies make up the top ten rank ordered competencies. Competencies about the Internet protocols are scattered throughout the lower half of the order.

In comparison of the data in Table 16, agents and specialists have the first two rank ordered competencies identical, *find electronic information resources relative to your field* and *search electronic resources to locate information*. The top five rank ordered competencies are the same ones among the two stratums, just in different order. The bottom of the rank ordered competencies had similarities among the agents and specialists, too. Specialists had these three competencies at the bottom of the order, *read electronically the Journal of Extension, demonstrate different telecommunication software to a community group*, and *identify at least four telecommunication software packages*. These three competencies are among the last four ordered competencies for the agent stratum. All the other competencies throughout the middle of the rank order are mixed enough to lack any similarities or distinct differences.

Table 16. Rank order of mean weighted discrepancy (WD) for the competencies by the agents (agts) with the specialists (specs) mean WD for comparison.

Competencies	Agts Mean	Specs Mean
Find electronic information resources relative to your field	6.76	7.05
Search electronic resources to locate information	6.23	6.49
Use information technologies in distance education	5.93	3.81
Recognize legal aspects of storing extra copies of information	5.40	3.94
Practice legal and ethical aspects of copyright law for electronic material	5.27	4.06
Practice legal aspects of keeping the name of a person who requests information confidential	5.26	3.42
Use a telecommunication software package	5.18	2.97
Use satellite video	5.11	3.15
Evaluate and interpret results of an information search	4.57	2.03
Load and use a CD-ROM	4.47	2.60
Follow instructions on the compute screen	4.26	2.98
Use synonymous terms to expand an electronic search	4.16	3.10
In preparing an electronic search, question a person in detail about the information desired	4.10	3.22
Transfer a file from Internet to a floppy disk or hard drive	4.06	3.50
Use email in distance education	3.95	2.49
Email a message that was prepared by word processing	3.62	2.95
Use an expert system	3.28	2.16
Identify hardware needed for telecommunications networks	3.20	0.29
Telnet to a remote computer	3.09	1.87
Properly transfer a file using ftp on Internet	3.08	3.08
Use the Internet almanac	2.94	2.22
Gather and transfer appropriate information before a request is made	2.90	2.33
Recognize that the quality of information varies between different publications	2.88	2.46
Exchange messages via email	2.79	2.86
Use the Internet gopher	2.76	2.21
Demonstrate different information technologies to a community group	2.60	0.46
Unsubscribe electronically from a news group	2.33	1.28
Describe Internet almanac	2.29	1.32
Subscribe electronically to a list server	2.19	0.98
Describe telnet	2.09	0.90
Unsubscribe electronically from a list server	2.05	0.63
Subscribe electronically to a news group	1.90	1.00
Describe ftp	1.68	0.81
Demonstrate different telecommunication software to a community group	1.57	-.14
Identify at least four telecommunication software packages	1.56	-.23
Describe gopher or veronica	1.43	0.86
Read electronically the Journal of Extension	0.90	-.07

Differences within Selected Demographic Factors

T-tests or analysis of variances, using the significant difference level of 0.05, were run for each WD against different demographics and other groupings. Demographics by years in the profession, years in current position, degree held, or organization memberships showed no statistical difference at the 0.05 level. The analyses were run against age, email versus regular postal mail return method, comfort level in answering an email survey, method of returning the survey by agents, and method of returning the survey by specialists. There was no significant difference among the means of the groups: age (three competencies), email versus regular postal mail return method (three competencies), comfort level in answering an email survey (five competencies), by agents by method of returning the survey (five competencies), and by specialists by method of returning the survey (one competency). These low numbers were attributed to expectation of random significance, rather than actual significant difference in the data (Cavey, 1992). After performing a t-test between the agent and specialist stratums, ten (27%) of the 37 competencies mean WD were significantly different at the 0.05 level. These data were arranged in Table 17. The agents had a higher mean WD for every competency listed thus inferring they set these competencies at a higher priority for training than the specialists. Four mean WD of the competencies varied drastically between the agents and specialists, $p = 0.009$ or smaller. These competencies were *identify hardware needed for telecommunications networks*, *demonstrate different telecommunication software to a community group*, *demonstrate different information technologies to a community group*, and *evaluate and interpret results of an information search*.

Table 17. Competencies mean WD significantly different between the stratums.

Competencies	Agents Mean	Specialists Mean	p*
Identify hardware needed for telecommunications networks	3.20	0.29	0.002
Use a telecommunication software package	5.18	2.97	0.019
Identify at least four telecommunication software packages	1.56	-0.23	0.011
Demonstrate different telecommunication software to a community group	1.57	-0.14	0.002
Describe ftp	1.68	0.81	0.049
Unsubscribe electronically from a list server	2.05	0.63	0.015
Telnet to a remote computer	3.09	1.87	0.048
Use satellite video	5.11	3.15	0.045
Demonstrate different information technologies to a community group	2.60	0.46	0.004
Evaluate and interpret results of an information search	4.57	2.03	0.009

*p was calculated for the 0.05 statistical significance level.

Preference of Instructional Methods

This section is representative of the respondent's instructional method preferences as revealed by the data in Table 18 through Table 21. The respondents selected one of six choices that best described their preferred mode of instruction. The capital letter "N" denotes population responses, whereas the lower case "n" denotes the stratum responses.

Data in Table 18 represent preferences to how respondents prefer to learn information technologies. Two instructional method preferences, *work with something tangible* (n = 39), and *work with others* (n = 32), accounted for 74.8 percent of the returns.

Table 18. Preferred method for learning information technologies by the stratums.

Learning	Agents		Specialists		TOTAL	
information technologies	n=66	%	n=29	%	N=95	%
Work on my own	4	6.1	5	17.2	9	9.5
Work with something tangible	28	42.4	11	37.9	39	41.1
Work with others	23	34.8	9	31	32	33.7
Work on clear-cut assignments	11	16.7	4	13.8	15	15.8
Organize things in my own way	0	0	0	0	0	0
Focus on ideas and concepts	0	0	0	0	0	0

Twenty-eight (42.4%) agents and 11 (37.9%) specialists prefer to *work with something tangible*. Of the 32 who prefer to *work with others* when learning information technologies, 23 were agents and nine were specialists. Nine (9.5%) respondents prefer to *work on their own*. The agent stratum had four (6.1%) responses to *working on their own*; however, the specialist stratum had 5 (17.2%) responses. The preference to *work on clear-cut assignments* was indicated by 15 (15.8%) of the respondents, 4 (13.8%) specialists and 11 (16.7%) agents. No one preferred to learn information technologies by *organizing things in their own way* or *focusing on ideas and concepts*.

Table 19 data indicate that approximately one-third (n =32) of the respondents prefer to learn new material by *studying with others and sharing ideas*. Of the 32 respondents, 24 (36.4%) were agents, while 8 (27.6%) were specialists. Twenty-three (24.2%) respondents, 16 (24.2%) of the agents plus 7 (24.1%) of the specialists, want to learn new materials by *performing a specific task*. There were 22 (23.2%) of the respondents who preferred to have *specific course objectives* when learning new material. Four (13.8%) specialists prefer *specific course objectives* whereas 18 (27.3%) of the agents prefer this approach.

Table 19. Extension professionals preference for learning new material.

	Agents		Specialists		TOTAL	
Learning new material	n=66	%	n=29	%	N=95	%
Study alone	1	1.5	6	20.7	7	7.4
Perform a specific task	16	24.2	7	24.1	23	24.2
Discuss the theory	5	7.6	3	10.3	8	8.4
Determine my own approach & proceed	2	3.0	1	3.4	3	3.2
Study with others & share ideas	24	36.4	8	27.6	32	33.7
Have specific course objects	18	27.3	4	13.8	22	23.2

Eight (8.4%) of the respondents prefer a *discussion of the theory*. Of these five (7.6%) were agents and three (10.3%) specialists. Seven (7.4%) respondents prefer to *study alone* when learning new materials. Only one (1.5%) agent chose this method in contrast to 6 (20.7%) of the specialists. The lowest preferred way of learning new material was to *determine my own approach and proceed*, 2 (3%) of the agents and 1 (3.4%) of the specialists chose this category.

As revealed by data in Table 20, the two stratums prefer different instructional methods for maximizing learning. The total population reflects the agent stratum, because the stratum was larger than the specialist stratum. Of the total population, 48.4% (n = 46) maximize learning when *practical, concrete examples are given by the instructor*. Twenty-four (25.3%) of the respondents prefer to maximize learning through *clear and definite assignments*. There were 11 (11.6%) of the respondents who maximize learning by having different approaches to the subject clearly explained by the instructor. Six respondents prefer to *set their own goals* to maximize learning. The preference to *work independently* had only 3 (3.2%) responses, while having the *instructor interested in students as individuals* had 5 (5.3%) responses.

Table 20. Preferred instructional method used by respondents to maximize learning.

Method used to maximize learning	Agents		Specialists		TOTAL	
	n=66	%	n=29	%	N=95	%
Given practical, concrete examples	36	54.5	10	34.5	46	48.4
Set my own goals	1	1.5	5	17.2	6	6.3
Work independently	0	0	3	10.3	3	3.2
Instructor interested in students as individuals	3	3.2	2	6.9	5	5.3
Different approaches to the subject clearly explained	9	13.6	2	6.9	11	11.6
Given clear and definite assignments	17	25.8	7	24.1	24	25.3

In comparison of the agent stratum and specialist stratum, 80.3% of the agents were concentrated in two learning preference choices, whereas the specialists were spread mainly among the four choices. The approaches to maximize learning most preferred were *practical, concrete examples when given by the instructor* chosen by 36 (54.5%) of the agents and *clear and definite assignments* chosen by 17 (25.8%) of the agents. The rest of the agents were divided among the other four categories; *different approaches to the subject clearly explained by the instructor* chosen by 9 (13.6%) of the agents, *the instructor is interested in the student as an individual* chosen by 3 (4.5%) of the agents, *set their own goals* chosen by one (1.5%) of the agents, while none of the agents maximize learning by *working independently*.

Throughout the specialist stratum, respondents were more diverse according to the data shown in Table 20. The highest preferred style, *practical, concrete examples are given by the instructor*, for maximizing learning was selected by 10 (34.5%) of the specialists. Five (17.2%) of the specialists prefer to *set their own goals*, while 3 (10.3%) prefer to *work independently* to maximize learning. The two lowest responses by specialists were the styles: *instructor is interested in the student as an individual*

and *different approaches to the subject clearly explained by the instructor*. Each style of learning had two (6.9%) of the specialists chose it. Seven (24.1%) of the specialists prefer to be *given definite assignments* to maximize learning.

The data in Table 21 represent what respondents find as the most valuable method of learning. Five (5.3%) respondents prefer to *use a textbook or resource book* as a method of learning. Of these 5 respondents, 4 (6.1%) were agents and one (3.4%) was a specialist.

Table 21. Method of learning found to be the most valuable to respondents.

	Agents		Specialists		TOTAL	
Most valuable learning method	n=66	%	n=29	%	N=95	%
Use a textbook or resource book	4	6.1	1	3.4	5	5.3
Internship or practicum	30	45.5	7	24.1	37	38.9
Work on a group project	3	4.5	3	10.3	6	6.3
Search for reasons to explain occurrences	2	3.0	1	3.4	3	3.2
Follow an outline or task sheet	24	36.4	14	48.3	38	40.0
Prepare your own outline	3	4.5	3	10.3	6	6.3

The use of an *internship or practicum* as a method of learning was preferred by 37 (38.9%) of the respondents; 30 (45.5%) agents and 7 (24.1%) specialists respectively. Six (6.3%) of the respondents value each of these methods of learning, *work on a group project* and *prepare your own outline*. Of these two methods, an equal number of agents and specialists (n = 3) preferred each method. The method of learning with the lowest agreement, three (3.2%) respondents, was *search for reasons to explain occurrences*. Two (3%) agents selected *search for reasons to explain occurrences*, while one (3.4%) specialist chose the method. The most valued method

of learning selected by 38 (40%) of the respondents was *follow an outline or task sheet*. This method was picked by 14 (48.3%) specialists and 24 (36.4%) agents.

The data in Table 22 and Table 23 explain training previously attended by respondents. Table 24 and Table 25 reveal the respondents' future training preferences. All data presented are based upon frequency of responses. The capital letter "N" denotes population responses, whereas the lower case "n" denotes the stratum responses.

Previous training on information technologies taken by respondents covered three questions. Dates were given for the most recent training attended. These dates ranged from 1986 through the present. The data on the length of time prior training lasted is shown in Table 22.

Table 22. Length of time most recent training lasted. (N = 85)

Time	N	%
1-3 hours	21	24.7
Half day	16	18.8
Full day	34	40.0
2-3 days	9	10.6
Other*	5	5.9

*College semester courses.

Thirty-four (40.0%) of the respondents attended full day training sessions. Nine (10.6%) of the respondents attended training that lasted 2 to 3 days long, while 5 (5.9%) of the respondents indicated they had taken college semester courses.

Data in Table 23 indicate the training attended by respondents that dealt with information technologies during the past five years. Almost fifty percent (actual 48.4%) have participated in 2 to 3 training sessions on information technologies during

the past five years. Of the 95 returns, 14 (14.7%) of the respondents took part in 4 or 5 training sessions, while 8 (8.4%) attended six or more.

Table 23. Training sessions attended by respondents in the past five years. (N = 95)

Number attended	N	%
0-1	27	28.4
2-3	46	48.4
4-5	14	14.7
6 or more	8	8.4

Table 24 and Table 25 categorized each stratum's future training preferences. The totals favor the agent stratum because that stratum represents twice the number of respondents compared to the specialist stratum. For the purpose of these two tables, the totals will be listed but not discussed.

As revealed by data in Table 24, thirty-seven (56.1%) of the agents indicate their main preference for length of training to be a full day, whereas 50 percent (n = 15) of the specialists prefer a half day of training. Ten (15.2%) of the agents favor half day training sessions.

Table 24. Preferences of respondents for length of future training sessions.

	TOTAL		Agents		Specialists	
Length of training sessions	N=96	%	n=66	%	n=30	%
Half day	25	26.0	10	15.2	15	50.0
Full day	44	45.8	37	56.1	7	23.3
2-3 days	18	18.8	14	21.2	4	13.3
Other*	9	9.4	5	7.6	4	13.3

*Depends on type of material taught.

Of the 33 specialists responding, 7 (23.3%) chose a full day for future training sessions. Two to 3 day training sessions were preferred by 14 (21.2%) of the agents and four (13.3%) of the specialists. Five (7.6%) of the agents and 4 (13.3%) of the specialists indicated other methods. Many suggested that training length depends on type of material taught.

The data in Table 25 represent how often respondents prefer update training to occur. Both choices, once per month and every two months, received identical responses; one (1.5%) agent and 2 (6.7%) specialists respectively.

Table 25. Preferences of respondents for frequency of update training sessions.

	TOTAL		Agents		Specialists	
Occurrence of update training	N=95	%	n=65	%	n=30	%
Once per month	3	3.2	1	1.5	2	6.7
Every two months	3	3.2	1	1.5	2	6.7
3-4 times per year	36	37.9	27	41.5	9	30.0
Every 6 months	33	34.7	23	35.4	10	33.3
Other*	20	21.1	13	20.0	7	23.3

*Once per year.

Thirty (n = 9) percent of the specialists favor update training to occur 3 to 4 times per year, while 41.5 (n= 27) percent of the agents prefer a similar number of sessions. Update training every six months was preferred by 23 (35.4%) of the agents and 10 (33.3%) of the specialists. Thirteen (20%) of the agents and 7 (23.3%) of the specialists indicated other and indicated they prefer update training once per year.

Comments Provided by Respondents

Appendix F includes the comments made by respondents about the survey, specific items, the study in general, or information technologies. The comments were randomly listed and any identifying information was removed. Similar comments made by respondents were pulled together and are listed below. These comments are relevant to the study because they show perceptions the respondents have toward information technologies that did not come forth in the data collected.

There were seven surveys which had comments stating the secretary is responsible for email. These comments were made by agents and specialists:

(1) We have two competent secretaries. Have not felt the need to become computer literate. Felt my time was better utilized teaching and organizing.

(2) Higher comfort level because wonderful secretaries put it on e-mail.

I felt very strong that it was our secretaries responsibility to learn and know about the E-mail and other computer programs. I had a problem finding time to do the training for all of this, so she provided that service.

(3) I am computer illiterate and it really doesn't bother me. I rely on them heavily and others around me do it for me.

(4) In our office 1 secretary receives and sends E-mail.

(5) Computer input was completed by my secretary.

(6) Secretary entered responses and transmitted this report.

(7) My secretary did it. [made in reference to question 53 on comfort level of responding to an email survey]

Another set of comments which show an important perception deals with the cost of long distance telephone calls. The cost was presented as an inhibiting factor for using email. Below are the comments from agents:

(1) I could get more practice on Internet if the costs were lower for poor folks outside the Bozeman area.

(2) Currently, we read our e-mail twice a week. This costs $20.00 per month (this is without sending any messages, only reading them). Our phone bill budget is $108 per month. Using e-mail will consume a majority of our phone budget. With more economic constraints being placed on the counties, it is better for us to use our penalty mail for correspondence than the phone bill.

(3) Too costly.

(4) Do you realize what the cost is for a 20-minute phone call? Responding electronically is not an economical option on long distance lines.

(5) I chose to send this overland due to it's length. I've found it fairly expensive to send longer documents (> 1 page) over the telephone.

Several comments about lack of equipment were made by agents and specialists, which affected their ability to respond electronically or utilize different information technologies. Another area of directed comments was the directions. One in particular sums it up: "Could not answer on line. No directions given-but wanted to do right on line as that was only 20 min."

Summary

The goal of this study was to determine the information-related competencies and training needed by Montana Extension professionals to acquire and disseminate information to clients electronically. The researcher determined the priority of training of competencies based on the weighted discrepancy scores (WD). This information was given in three sections: perceived level of importance, perceived level of knowledge, priority for training based on mean weighted discrepancy scores, and in

Table 10 through Table 16. Another section of information was the differences within selected demographic factors, along with Table 17. The researcher ascertained the population's instructional method and training preferences covered in the section preference of instructional methods, including Table 19 through 25. The data indicate that the objectives of the study were met.

CHAPTER 5
CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The purpose of the study was to determine perceived level of importance and knowledge of selected information-related competencies and training needed by Montana Extension Service (MES) professionals for electronically acquiring and disseminating information. The sections in this chapter include: (1) conclusions, (2) implications, (3) recommendations, and (4) summary.

To fulfill the purpose of this study, the following objectives were identified. Extension professionals were surveyed to determine the:

(1) Perceived level of importance of selected information-related competencies needed for electronically acquiring and disseminating information;

(2) Perceived level of knowledge of selected information-related competencies needed for electronically acquiring and disseminating information;

(3) Priority for training of information-related competencies based on the weighted discrepancy score;

(4) Preference of instructional method used for information-related competencies; and

(5) Differences within selected demographic factors influenced the mean weighted discrepancy score.

Conclusions

Based on the objectives and data analysis, the following conclusions were drawn:

(1) That lower ranked competencies must be taught in order for respondents to demonstrate knowledge and understanding of competencies with higher mean weighted discrepancy scores or higher ranked competencies. Therefore, competencies with a positive WD need to be taught.

(2) Selected demographic factors and other characteristics showed no influence on the competencies because both of the stratums need further education in information-related competencies. This is suggested by the high WD of all of the competencies. All respondents need training no matter their age, position, degree held, nor organizational memberships.

(3) The agents need more training than the specialists in competencies dealing with: (a) telecommunication hardware and software packages; (b) the Internet protocols; (c) a few of the other information technologies beside the Internet; and (d) the evaluation and interpretation of the results of an information search. This is evident by the significant difference of t-scores on ten competencies.

(4) Different training sessions need to be developed for each stratum because of the reported difference in the ranked competencies, preferred instructional method, and training preferences.

(5) That a lack of equipment, the cost of long distance telephone calls, or the secretary given the responsibility to do email limits the efforts of MES professionals in using electronic information technologies. Electronic information technologies are not viewed by some respondents as tools to obtain a variety of information. Furthermore, this has limited MES professional's attitude or philosophy toward electronic information technologies.

Implications

The data collected for this study allowed the researcher to determine the following implications:

(1) MES specialists do not use the full potential of information technologies. With more then half of the specialists returning the survey through regular mail suggests that they have not taken advantage of their close proximity to personnel or courses dealing with information technologies.

(2) The comfort level mean of 2.81 suggests a higher rate of anxiety among MES professional when dealing with email than what Smith and Kotrlik (1990) found in their study.

(3) Based on the comments made by some respondents, they have no or little knowledge of the VMS system. The respondents who are hardwired using the Pathworks telecommunication software may have had problems using some of the commands given in the directions. Directions for the VMS system at MSU were included with the letter and the survey.

Recommendations

The following recommendations are based both on the research findings of this study and the comments made by the respondents. The follow-up of these recommendations will increase the information literacy skills of current and future MES professionals.

Recommendations for Development and Improvement

(1) Acquire a toll free 800 number for agents and specialists, when away from MSU, to use to dial into email, the Internet, and any other information technology prospects. The comments suggest that if the call is not free, they will not use email, the Internet, etc... The Burns telecommunication center may be one source of funding a toll free number.

(2) Use a variety of instructional methods during training sessions to take advantage of the preferred method of learning as indicated by the agents or specialists attending the session. This will increase their learning potential and promote continued use of information technologies.

(3) University extension education courses must include instruction on the utilization of information technologies. A specific course developed to cover all of the information-related competencies, or information technology assignments worked into all existing courses would meet this recommendation.

(4) Purchase, place, and update every three years the necessary computer hardware needed to run any information technology application in every agent's and specialist's office. The respondent's comments indicate that access to the necessary equipment is a hindrance in learning and/or using information technologies.

(5) Set up incentives or reward system to encourage exploration and use of information technologies by Extension professionals. Include use of information technologies in the job position description and evaluate it during the annual, two year, promotion, and tenure reviews.

(6) Require certain types of information be communicated only by email. This would force agents and specialists to use email on a regular basis.

Recommendations for Further Study

(1) Conduct similar studies in other states to determine any similarities among a broader Extension population.

(2) Direct a study to investigate how much the secretaries or administrative assistants of agents and specialists do with email and other information technologies for the agent or specialist.

(3) Conduct research to determine the material needed for teaching update or in-service training on information technologies.

(4) Carry out a study of randomly selected "Extension clients" in Montana to see if they would consider going to an agent or specialist for help with information technologies.

(5) Conduct a study of randomly selected "Extension clients" in Montana to see if they would support a fee-based service for information.

Summary

The data from this study reveal several factors which are impacting the use of information technologies by agents and specialists. Competencies with a positive WD need to be taught. Selected demographic factors and other characteristics showed no influence on the competencies because both of the stratums need further education in information-related competencies. Different training sessions need to be developed for each stratum because of the reported difference in the ranked competencies, preferred instructional method, and training preferences. A lack of equipment, the cost of long distance telephone calls, or the secretary given the responsibility to do email limits the efforts of MES professionals in using electronic information technologies.

Following the recommendations put forth will enhance exploration and use of information technologies: (1) Acquire a toll free 800 number for agents and specialists, when away from MSU, to use to dial into email, the Internet, and any other information technology prospects; (2) University extension education courses must include instruction on the utilization of information technologies; (3) Purchase, place, and update every three years the necessary computer hardware needed to run any information technology application in every agent's and specialist's office; (4) Set up incentives or reward system to encourage exploration and use of information technologies by Extension professionals; (5) Require certain types of information be communicated only by email; (6) University extension education courses must include instruction on the utilization of information technologies.

The information gained from this study will be useful to Director of Montana Extension Service, the Department of Agriculture and Technology Education, other MSU departments, and possibly other universities or government agencies. The information herein could be of value to those involved with training or updating MES professionals in information technologies' uses.

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APPENDICES

APPENDIX A

LETTER

January 5, 1994

1~ 2~
3~

Dear Mr/s. 2~:

Communication and information technologies are omnipresent in our daily routines. ES-USDA's FACT report of 1992 suggests that there is a need to increase staff knowledge and skills in communication and information technologies. A masters thesis study is underway to determine perceived importance and knowledge of selected information-related competencies and training needed relative to Montana Extension Service (MES) Professionals for electronically gathering and transferring information. This thesis study is a cooperative adventure between Montana Extension Service (MES), the Montana State University Agriculture and Technology Education Department, and MSU Libraries.

An electronic mail survey will be sent to you via your e-mail address first thing Monday morning, January 10, 1994. Your responses to the items in the survey are important. Using electronic mail as the medium for sending and receiving a survey is a relatively new practice. This study is important for future e-mail surveys, along with improving information technology instruction. The survey takes about 20-30 minutes to complete, depending on your ability with e-mail. Your responses will be kept confidential. Please return the completed survey by
Wednesday, February 9, 1994.

Enclosed is a printed set of directions for responding to the survey. This duplicates the directions that will be sent electronically with the survey. If you have any questions, feel free to contact Nat Jaeggli at AAXNJ (e-mail) or 994-5638 (phone), or Jodee Kawasaki at ALIJK (e-mail) or 994-6549 (phone). In advance, thank you for your valuable time and assistance.

Sincerely,

Jodee Kawasaki
Reference Librarian
& Graduate Student

Andrea L. Pagenkopf
Vice Provost for Outreach
& Director of Extension

APPENDIX B

DIRECTIONS

ELECTRONIC INFORMATION SURVEY

The questions for the study are about the perceived level of importance and knowledge of selected information-related competencies and training needed relative to Montana Extension Service Professionals for electronically gathering and transferring information. There are 53 questions to answer, so allow 20-25 minutes to complete the survey.

DIRECTIONS

There are two ways to respond to the survey. You can do it on-line, while reading your mail or do it off-line, using a word processing program (Word Perfect). The first set of directions explains how to respond off-line. These directions come directly from the "Extension Network Users Manual" developed by Nat Jaeggli and Ruth Williams.

1) Extract mail message.

2) Download file using Kermit.

3) Answer survey using Work Perfect or other word processing software.

4) Save as Dos text.

5) Upload file using Kermit.

6) Send file to MSU::ALIJK.

Please return the completed survey with your answers by

WEDNESDAY, FEBRUARY 9, 1994

If you have any questions, feel free to contact Nat Jaeggli at AAXNJ (e-mail) or 994-5638 (phone), or Jodee Kawasaki at ALIJK (e-mail) or 994-6549 (phone). Thank you for responding; the information will be very useful for my research. Your responses to the questionnaire will be meaningful in improving training efforts and developing competencies that Extension professionals need. Your responses will be kept strictly confidential. If you would like a copy of the results, please mark the last question appropriately.

Second set of directions:

Read this survey like regular e-mail; however, heed these practices when ready to respond:

==> you only need to reply once;
==> reply automatically to address the survey to ALIJK (Jodee Kawasaki);
==> do NOT use the enter key; this adds blank lines.

With the above information in mind, follow these steps:

1) Retrieve "Electronic Information Survey" on the screen.

2) At the mail prompt, type 'reply/ext', then press enter.

3) Use the up/down arrow keys to move between responses and questions.

4) Use the left/right arrow keys to move from side to side for answering both importance and knowledge. The command keys can also be used to move from side to side. Ctrl e (simultaneously) moves cursor to the far right of the screen Crtl b (simultaneously), followed by type sta or start, then press enter; moves cursor to the far left.

5) Place the appropriate response in the line provided for each question.

6) Press Ctrl z (simultaneously) after completely the survey.

Thank you for responding. Please return the completed survey with your answers by

WEDNESDAY, FEBRUARY 9, 1994.

The information will be very useful for my research. Your responses to the questionnaire will be meaningful in improving training efforts and developing competencies that Extension professionals need. Your responses will be kept strictly confidential. If you have any questions, feel free to contact Nat Jaeggli at AAXNJ (e-mail) or 994-5638 (phone), or Jodee Kawasaki at ALIJK (e-mail) or 994-6549 (phone). If you would like a copy of the results, please mark the last question appropriately.

APPENDIX C

SURVEY INSTRUMENT

SURVEY

COMPETENCIES

Please rank the following competencies based on your experiences and knowledge. In the space provided on the left hand side, place a number from 1-5 indicating the level of importance, with 1 being not important and 5 being very important. On the right hand side, mark from 1-5 indicating your level of knowledge, with 5 representing that you have vast knowledge of the competency, 1 representing no knowledge of the competency.

LEVEL OF IMPORTANCE	LEVEL OF KNOWLEDGE
1=not important	1=no knowledge
2=less important	2=little knowledge
3=somewhat important	3=somewhat knowledgeable
4=more important	4=more knowledgeable
5=very important	5=very knowledgeable

COMPETENCIES RELATED TO TECHNOLOGIES

Importance		Knowledge
____	1. IDENTIFY HARDWARE NEEDED FOR TELECOMMUNICATIONS NETWORK.	____
____	2. USE A TELECOMMUNICATION SOFTWARE PACKAGE.	____
____	3. IDENTIFY AT LEAST FOUR TELECOMMUNICATION SOFTWARE PACKAGES.	____
____	4. DEMONSTRATE DIFFERENT TELECOMMUNICATION SOFTWARE PACKAGES TO A COMMUNITY GROUP	____
____	5. EXCHANGE MESSAGES VIA E-MAIL.	____
____	6. E-MAIL A MESSAGE THAT WAS PREPARED IN WORD PERFECT.	____
____	7. TRANSFER A FILE FROM THE INTERNET TO A FLOPPY DISK OR HARD DRIVE.	____

____ 8. DESCRIBE INTERNET ALMANAC. ____

____ 9. DESCRIBE TELNET. ____

____ 10. DESCRIBE GOPHER OR VERONICA. ____

____ 11. DESCRIBE FTP. ____

____ 12. SUBSCRIBE ELECTRONICALLY TO A NEWS GROUP. ____

____ 13. UNSUBSCRIBE ELECTRONICALLY FROM A NEWS GROUP. ____

____ 14. SUBSCRIBE ELECTRONICALLY TO A LIST SERVER. ____

____ 15. UNSUBSCRIBE ELECTRONICALLY FROM A LIST SERVER. ____

____ 16. USE THE INTERNET GOPHER. ____

____ 17. PROPERLY TRANSFER A FILE USING FTP ON THE INTERNET. ____

____ 18. TELNET TO A REMOTE COMPUTER. ____

____ 19. USE THE INTERNET ALMANAC. ____

____ 20. LOAD AND USE A CD-ROM. ____

____ 21. USE AN EXPERT SYSTEM. ____

____ 22. USE SATELLITE VIDEO. ____

____ 23. FOLLOW INSTRUCTIONS ON THE COMPUTER SCREEN AS THEY APPEAR. ____

____ 24. DEMONSTRATE DIFFERENT INFORMATION TECHNOLOGIES TO A COMMUNITY GROUP. ____

____ 25. USE INFORMATION TECHNOLOGIES IN DISTANCE EDUCATION. ____

____ 26. USE E-MAIL IN DISTANCE EDUCATION. ____

LEVEL OF IMPORTANCE	LEVEL OF KNOWLEDGE
1=not important	1=no knowledge
2=less important	2=little knowledge
3=somewhat important	3=somewhat knowledgeable
4=more important	4=more knowledgeable
5=very important	5=very knowledgeable

COMPETENCIES RELATED TO INFORMATION

Importance		Knowledge
____	27. SEARCH ELECTRONIC RESOURCES TO LOCATE INFORMATION.	____
____	28. FIND ELECTRONIC INFORMATION RESOURCES RELATIVE TO YOUR FIELD.	____
____	29. READ ELECTRONICALLY THE JOURNAL OF EXTENSION.	____
____	30. RECOGNIZE THAT THE QUALITY OF INFORMATION VARIES BETWEEN DIFFERENT PUBLICATIONS.	____
____	31. IN PREPARING AN ELECTRONIC SEARCH, QUESTION A PERSON IN DETAIL ABOUT THE INFORMATION DESIRED.	____
____	32. EVALUATE AND INTERPRET RESULTS OF AN INFORMATION SEARCH.	____
____	33. USE SYNONYMOUS TERMS TO EXPAND AN ELECTRONIC SEARCH.	____
____	34. PRACTICE LEGAL AND ETHICAL ASPECTS OF COPYRIGHT LAW FOR ELECTRONIC MATERIAL.	____
____	35. PRACTICE LEGAL ASPECTS OF KEEPING THE NAME OF A PERSON WHO REQUESTS INFORMATION CONFIDENTIAL.	____
____	36. RECOGNIZE LEGAL ASPECTS OF STORING EXTRA COPIES OF INFORMATION.	____
____	37. GATHER AND TRANSFER APPROPRIATE INFORMATION BEFORE A REQUEST IS MADE.	____

TRAINING INFORMATION

38. Please list the date (month and year) of the most recent educational course/training taken which dealt with communications or information technologies.

_____

39. How long did the course/training last? (mark one please)

_____ (A) 1-3 HOURS
_____ (B) 1/2 DAY
_____ (C) FULL DAY
_____ (D) 2-3 DAYS
_____ (E) OTHER (FREQUENCY) _____

40. How many educational courses/training have you attended in the past five years which dealt with information technologies? (please mark one with an X)

_____ (A) 0-1
_____ (B) 2-3
_____ (C) 4-5
_____ (D) 6 OR MORE

Questions 41-44: please read and place an X in front of your most preferred approach to learning information technologies. (check only one)

41. Which of the following best describes how you prefer to learn information technologies.

_____ (A) WORK ON MY OWN.
_____ (B) WORK WITH SOMETHING TANGIBLE.
_____ (C) FOCUS ON IDEAS AND CONCEPTS.
_____ (D) ORGANIZE THINGS IN MY OWN WAY.
_____ (E) WORK WITH OTHERS.
_____ (F) WORK ON CLEAR-CUT ASSIGNMENTS

42. Which of the following best describes your preference to learning new material.

_____ (A) STUDY ALONE INSTEAD OF STUDYING WITH SOMEONE ELSE.
_____ (B) PERFORM A SPECIFIC TASK.
_____ (C) HAVE A KNOWLEDGEABLE INSTRUCTOR DISCUSS THE THEORY UPON WHICH A PRACTICE IS BUILT.
_____ (D) DETERMINE MY OWN APPROACH AND PROCEED ACCORDINGLY.
_____ (E) JOIN A GROUP OF LEARNERS TO STUDY TOGETHER AND SHARE IDEAS.
_____ (F) GET SPECIFIC COURSE OBJECTIVES FROM THE INSTRUCTOR AND A CLEAR UNDERSTANDING OF WHAT WILL OCCUR IN THE COURSE.

43. Which of the following best indicates what caused you to maximize learning during a formal instructional situation.

_____ (A) THE INSTRUCTOR GAVE ME MANY PRACTICAL, CONCRETE EXAMPLES.
_____ (B) THE INSTRUCTOR LET ME SET MY OWN GOALS AND TRY DIFFERENT APPROACHES TO REACH THEM.
_____ (C) THE INSTRUCTOR ENCOURAGED ME TO WORK INDEPENDENTLY.
_____ (D) THE INSTRUCTOR SEEMED TO BE INTERESTED IN STUDENTS AS INDIVIDUALS.
_____ (E) THE TEACHER CLEARLY EXPLAINED THE RELATIONSHIPS BETWEEN DIFFERENT APPROACHES TO A SUBJECT.
_____ (F) THE INSTRUCTOR MADE CLEAR AND DEFINITE ASSIGNMENTS, TASKS, AND I KNEW WHAT WAS EXPECTED.

44. Which of the following do you find most valuable as a method of learning.

_____ (A) STUDY A TEXTBOOK OR RESOURCE BOOK.
_____ (B) ENGAGE IN AN INTERNSHIP OR PRACTICUM.
_____ (C) PREPARE A PROJECT WITH OTHER STUDENTS.
_____ (D) SEARCH FOR REASONS TO EXPLAIN OCCURRENCES.
_____ (E) FOLLOW AN OUTLINE OR TASK SHEET PREPARED BY THE INSTRUCTOR.
_____ (F) PREPARE YOUR OWN OUTLINE.

45. How long would you prefer an introductory course/training to last? (please mark one with an X)

_____ (A) 1/2 DAY
_____ (B) FULL DAY
_____ (C) 2-3 DAYS
_____ (D) OTHER (PLEASE SPECIFY)_____

46. How often would you prefer update training to occur? (please mark one with an X)

_____ (A) ONCE A MONTH
_____ (B) ONCE EVERY TWO MONTHS
_____ (C) 3-4 TIMES PER YEAR
_____ (D) EVERY 6 MONTHS
_____ (E) OTHER (PLEASE SPECIFY)_____

DEMOGRAPHIC INFORMATION

47. POSITION TITLE _____

48A. _____ AGE
48B. _____ YEARS IN PROFESSION
48C. _____ YEARS IN CURRENT POSITION

49. _____ FEMALE _____ MALE

50. Highest degree earned (please mark one with an X)

_____ (A) DOCTORATE
_____ (B) MASTER
_____ (C) BACHELOR

51. Number of professional organizations to which you belong (place a number in any that apply)

_____ (A) LOCAL OR COUNTY LEVEL
_____ (B) STATE LEVEL
_____ (C) REGIONAL LEVEL
_____ (D) NATIONAL LEVEL
_____ (E) INTERNATIONAL LEVEL

52. Do you want a copy of the results? _____ YES _____ NO

53. What is your comfort level in responding electronically to this survey. 1=not comfortable at all; 5=very comfortable.

_____

Comments?

THANK YOU FOR TAKING THE TIME TO RESPOND!!!

APPENDIX D:

FIRST FOLLOW-UP EMAIL MESSAGE

TO: ACX??
SUBJ: REMINDER, Response needed!

January 26, 1994

Dear [name]:

This note is a reminder that we have not yet received the Electronic Information Survey sent to you two weeks ago. We know this is a busy time of year for you and appreciate the value of the time needed to complete the survey but YOUR response is important!

If you have sent the survey via e-mail today, thank you very much. If not, please take the time to give us your response now. Thank you.

Sincerely,

Jodee Kawasaki
Reference Librarian &
Graduate Student

Andrea Pagenkopf
Vice Provost for Outreach &
Director of Extension

APPENDIX E:

SECOND FOLLOW-UP EMAIL MESSAGE

TO: ACX??
SUBJ.: URGENT! RESPOND NOW!

February 7, 1994

Dear [name]:

A few weeks ago you received a survey, then a reminder note asking you to respond to the Electronic Information Survey. Now it is crucial for you to respond. Your participation in this study is very important. The information that you provide will assist us in making recommendations to improve information technology instruction for Montana Extension Professionals. In case you have deleted the electronic version or miss placed a printed copy of it, the survey is enclosed with this note.

We know this is a busy time of year for you and appreciate the value of the time needed to complete the survey but YOUR response is important! Due to the limited time, the completed survey must be returned by (or shortly there after) FEBRUARY 9, 1994, WEDNESDAY.

If you have sent the survey via e-mail today, thank you very much. If not, please take the time to give us your response now. Thank you for your time and effort.

Sincerely,

Jodee Kawasaki
Reference Librarian &
Graduate Student

Andrea Pagenkopf
Vice Provost for Outreach &
Director of Extension

APPENDIX F:

RESPONDENT'S COMMENTS

We have two competent secretaries. I have not felt the need to become computer literate, felt my time was better utilized teaching and organizing.

Questions have more than 1 answer. Where is this going?

Higher comfort level because wonderful secretaries put it on e-mail.

I chose to send this overland due to it's length. I've found it fairly expensive to send longer documents (> 1 page) over the telephone. The actual technology is fairly easy.

Not familiar with program. Too much time on line to complete the questionnaire.

The questions are interesting. I did not have equipment to respond electronically. My computer does not accept the 5 1/2" disc. My E-MAIL is pulled off at the Extension office in Stillwater County and I get the hard copy.

I need to clarify where my responses are coming from. I just completed 26.5 years as Extension Agent. I felt very strong that it was our secretaries responsibility to learn and know about the E-mail and other computer programs. I had a problem finding time to do the training for all of this, so she provided that service. I do know how to use the CD-Rom and IZE, and have used these systems extensively.

Instructions were for Telix--not campus--Did not know how to keep questions on screen while replies were made and did not want to retype.

I am computer illiterate and it really doesn't bother me. I rely on them heavily and others around me do it for me.

Jodee, I'm not wired yet, so my survey is not of any use to you yet. Sorry.

I really didn't understand most of the technologies asked about.

Nowhere in this survey was I asked <u>why</u> I was interested in "electronic information" or how I use it now or intend to use it. It would seem critical to know that in determining the reasons for current and future use of "technology."

Time allotment was accurate.

In our office 1 secretary receives and sends E-mail. The old computer I use does not have a modem. Since my time is so limited, I have not used the computer to it's full capacity-not even a small bit of what I know can be done.

After no luck with the telephone, I decided to write in my answers and send them along. I have kept a copy so I can input with the secretary's help (if essential). This is a busy time for us! I hope this helps you know I need help in this area.

From my perspective as a County Extension Agent, I feel that we need MORE training to access the information that's "out-there": not only for our clients, but also for our own education pursuits. Also, again from my own perspective, I feel that as an Extension Agent, I must be fully competent in this field of electronic information gathering/dissemination.

Final Comment: If the Agents do not avail themselves and use this tool, i.e., electronic information gathering/dissemination, they will go the route of the dinosaur, and, perhaps, consider seeking different employment. I feel that we, as Agents, must be on the cutting edge of using this knowledge in order to survive in the future.

Computer input was completed by my secretary.

I was not able to send the information electronically.

This made me feel like I have a lot to learn! I didn't get enough of this type of learning while in college.

Do you realize what the cost is for a 20-minute phone call? Responding electronically is not an economical option on long distance lines.

Survey is too long. Directions for electronic response not clear.

It will be interesting to know results!

In the case of some of these questions, I don't feel the knowledge or skill is necessary for the position or the agent in general.

Secretary entered responses and transmitted this report.

Too costly. I will try to send this E-mail. If we lose it, you will receive a hard copy. Really need training on sending E-mail via ASCII. Seemed to have missed a step in the instructions in the past.

Currently, we read our e-mail twice a week. This costs $20.00 per month (this is without sending any messages, only reading them). Our phone bill budget is $108 per month. Using e-mail will consume a majority of our phone budget. With more economic constraints being placed on the counties, it is better for us to use our penalty mail for correspondence than the phone bill.

I didn't respond electronically. I copied it to word perfect and am now sending you that copy.

It would have been much more appropriate for a survey of this length to have been mailed out along with a return envelope. Electronic mail is not the answer to everything. Something of this length is too long to retrieve, respond to on a computer within a word processing program and then download and ship back over E-Mail.

I'm not familiar with several of the terms and acronyms (gopher, ftp-my co-worker defined this one for me) you used in the survey. If I never heard of it, how can I evaluate its importance.

Excellent idea, saves time and money, I could get more practice on internet if the costs were lower for poor folks outside the Bozeman area.

Electronic technology would be easier if each of us had machines that were capable of the technology within our own reach instead of having one machine that sits at the secretary's desk.

Honestly, I need to become more knowledgeable. If I don't use information regularly though, I tend to forget some things.

I could not answer on line. No directions given-but wanted to do right on-line as that was the only 20 min. I could not get on the computer, as my secretary was trying to make-up needed work and get late newsletters out. Time crunch with <u>one</u> computer/modem in office=I can't always get time on the computer to get on-line.

I wasn't able to answer on-line, so I copied <u>all</u> that appeared on our screen-no on-line directions.

Access has to do with only one computer/modem in office. If we are to be effective-each agent should have a computer/modem on their desk.

Fun. Have done a bunch of surveys myself and would be glad to compare some of our findings with yours. We just finished a survey of high school science teachers from across the U.S. regarding learning preferences. I did the same with 1500 Montana rural residents, and J.S. and I have been working with the Montana Farm and Ranch Survey for several years now, attempting to learn the learning preferences and characteristics of Montana Farmers and Ranchers - the diffusion/adoption approach to learning. Would be glad to talk about them. Let me know or contact J.S.

I have been teaching courses and using EMAIL with my students for the past couple of years. I love it and find it a very rewarding and satisfying approach to distant delivery education. Most of what I do with the Burns Network is quite structured, to a very selective audience committed to learning beyond the awareness level. My intent with these audiences is to teach them sufficient technical information that they can transfer the knowledge to other users. That was our goal with agents at one time, but agents seem to have been overloaded with so many "emerging issues" to deal with that they seem to seldom have time to become specialized to skilled anymore. I would like very much to be able to "capture" and deliver to the agents as a "targeted audience", but I don't see that happening anymore. I don't know what I can offer to the agents other than a mechanism for information transfer and location of information. Through the Business Department, I have gained a good understanding of marketing concepts, i.e., start with a target and ten develop a marketing mix that will satisfy them--product, price, place, promotion. I know how to reach the place - electronically; but I still am not sure what is the product, how to promote the product to the agents, and what price to charge for it. In the past, all we told the agent they had to do was set up chairs, get coffee and donuts, and advertise--we would do the rest. It's not working that way anymore, but I'm still investigating and will come up with a new approach soon. I'm afraid the electronic media and networking capability will bypass the agent all together, we will be able to go directly to the audience--the end user, over modem, internet, telephone and in-home interactive video--won't be long.....

Interesting survey. Will enjoy reading about what you learn from all this.....

My secretary did it. [in reference to question 53 on comfort level of responding to an email survey]

Traveling, so I did it a 3rd way. Better than getting no response at all.

Need info on copyright specifically for BBB's, databases etc. [in reference to competency 36]. Anticipate needs--but unneeded or unwanted info on E-mail, BBB's, etc. [in reference to competency 37]

The problem with the importance question is with little knowledge I really don't know the level of importance.

To me personally or to the organization [in reference to rating level of importance]. #47 is too identifiable--a better response would be: ____Specialist _____County _____Admin.